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REPORT RESUMES

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A STUDY OF FACTORS OPERATIVE IN THE SELECTIVE RETENTION OF STUDENTS IN TEACHER EDUCATION, PART I.
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THE PURPOSE OF THIS STUDY WAS TO DISCOVER THE PERSONALITY AND EXPERIENCE FACTORS WHICH DISTINGUISH STUDENTS WHO ARE SUCCESSFUL IN PROFESSIONAL TEACHER TRAINING COURSES AND ACTUALLY ENTER TEACHING, FROM THE PERSONALITY AND EXPERIENCE FACTORS OF STUDENTS WHO DROP OUT ALONG THE WAY. INFORMATION WAS GATHERED FROM ALL STUDENTS WHO ENTER THE JUNIOR PROFESSIONAL SEQUENCE OF COURSES IN THE COLLEGE OF EDUCATION. THESE STUDENTS WERE DIVIDED INTO GROUPS ACCORDING TO THEIR MAJOR AREA. THE KINDS OF DATA WHICH WERE COLLECTED INCLUDED SUCH ITEMS AS BIOGRAPHICAL INFORMATION, ACADEMIC RECORDS, INTERVIEW REPORTS, AND TEST MEASURES OF ABILITIES AND INTERESTS. THERE WAS IMMEDIATE FOLLOWUP OF STUDENTS WHO DROPPED OUT AT VARIOUS POINTS DURING THE TRAINING PROGRAM, AND THE FINAL ANALYSES WERE DESIGNED TO DETECT THE DIFFERENCES BETWEEN THOSE WHO PERSISTED AND THOSE WHO LEFT. THE MOST SIGNIFICANT IMPLICATION FOR FURTHER RESEARCH WAS THE NEED TO CONTINUE THE PROCEDURES WHICH HAVE BEEN ESTABLISHED AND TO EXTEND DATA THAT HAVE BEEN GATHERED FOR THE INITIAL POPULATIONS OF STUDENTS. (JL)

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ota Studies of Student Personnel Work in Teacher Education

A STUDY of FACTORS OPERATIVE in the SELECTIVE RETENTION of STUDENTS in TEACHER EDUCATION

PART I

Roger E. Wilk
Walter W. Cook
with
William H. Edson
Charles J. Glotzbach

Minnesota Studies of Student Personnel Work in Teacher Education

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A STUDY OF FACTORS OPERATIVE IN THE SELECTIVE RETENTION OF STUDENTS IN TEACHER EDUCATION
PART I

by
Roger E. Wilk and Walter W. Cook

with
William H. Edson and Charles J. Glotzbach

Student Personnel Office
College of Education
University of Minnesota
July, 1963

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The research reported herein was performed pursuant to a contract with the U.S. Office of Education, Department of Health, Education, and Welfare

Foreword

This prologue is addressed to the reader in the hope that it may serve to place this research report in perspective. Because this is the first report of a projected longitudinal study, the initial chapters, which describe the point of view and the procedures, are of special importance. These chapters not only set the stage for the results reported here but for subsequent research as well. The results should be viewed as an initial description of students in the early years of a long term study. With projects currently under way, additional numbers of students will be added to the reported population, and this larger number will be studied over a longer span of years. The major significance of this study lies in the point of view developed, the procedures established and the implications that each of these have for studying the six year sample of teacher education students during their professional education and the first years of their vocational lives. This is not to minimize the results reported here. They are important and do have significance, but the big payoff remains for the years ahead. Such promises for the future may seem overly optimistic, but they are realistic in view of the foundations which have been established.

The report of this first part of the longitudinal study has been delayed long past the original scheduled date. For this delay we apologize. We have learned, and our experience has since been confirmed by other investigators, that longitudinal studies make unusual and unanticipated demands. Scheduled data gathering deadlines cannot be postponed; writing can. The pace of data collection cannot be slacked. Students reach critical points at which time information must be collected, order and recorded. If it is not obtained at the critical moment, it is forever lost.

Unanticipated benefits have also accrued from participation in this research. Members of the research staff have been invited at various times to participate in conferences and professional meetings which focused on topics for which this research was relevant. An inter-institutional conference for Big Ten schools for which the College of Education was host came as a direct result of the research program. Among our own faculty there has also been an increased interest in this study and its implications for the operation of the College. These and other opportunities to communicate the nature of this research have been rewarding.

Our hope is that we may continue to build information that will provide more adequate descriptions of students in teacher education and their subsequent professional activities.

REW
July, 1963
Minneapolis, Minnesota

Acknowledgments

Acknowledgments give an opportunity to record the participation of the project staff as well as to recognize the contribution that others, not on the project staff, have made to this particular research effort.

The guiding spirit behind this project has been that of Dr. Walter W. Cook, Dean of the College of Education. It was at his instigation that plans were made to begin the research activities of which this project has been one part. His points of view concerning teacher education and the research that is needed are a continuing important influence. Throughout the project Dean Cook has consulted with the project staff and participated in formulating the policies and procedures that have guided this research project.

The conduct of the research as well as the preparation of the report have been the responsibility of the project director, Roger E. Wilk. He has been responsible for the staffing and programming of the project as well as for participation in making policy decisions which determine the broader outlines of the project.

From its inception this research has been an integral part of the operation of the Student Personnel Office of the College of Education. Dr. William H. Edson, the Director, and Dr. Charles J. Glotzbach, the Assistant Director who is responsible for the office operations, have been continually involved in the project, but most intensively during the initial year of the study when the Student Personnel record keeping procedures were revised to meet the demands of the longitudinal research.

Since the beginning of the project, the director has been fortunate to have on his staff a succession of competent women who have made a major contribution by maintaining and developing the system of personnel records. Mrs. Patricia McCawley assisted in the development of the system, and Miss Pomala Wilson and Mrs. Louise Hudson made significant contributions to the procedures that are currently used. The preparation of data for analysis and the statistical calculations were conducted under the supervision of George Y. Fujita, a research fellow on the project. Two different undergraduate assistants, Rodney Doran and David Bahnmann, gave competent assistance in the computations.

Just as the Student Personnel Office depends upon other University offices and bureaus in the operation of its program, so it was with this research project. In the University Office of Admissions and Records, Dr. Theodore E. Kellogg, Director of Admissions, and Mr. True E. Pettengill, Recorder, were most helpful in revising forms and procedures to make the collection of longitudinal data more efficient. With the assistance of Dr. Ralph F. Berdie, Director of the Student Counseling Bureau, changes were made in the method of reporting test scores, which made these data more amenable to analysis. Dr. Edward O. Swanson, of the Student Counseling Bureau, and Mrs. Eunice Petrick, of the Student Counseling Bureau, IBM installation supervisor, were particularly helpful in the preparation and processing of data. Dr. Marvin L. Stein, Director of the Numerical Analysis Center, and his staff made the Univac Scientific computer available for certain statistical analyses.

Numerous colleagues in the College of Education have been helpful in various aspects of this research. Particular acknowledgment is given to Dr. Raymond O. Collier, Jr., Dr. Robert L. Lathrop, and Mr. Donald G. MacEchren, who gave counsel and guidance in planning and conducting the statistical analysis. Acknowledgment is also due to Miss Florence E. Iverson who has assisted in the preparation and editing of the manuscript, and to Miss Barbara K. Aho, who has most competently prepared the manuscript for publication.

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Chapter I

The Problem and the Approach

Graduation from an accredited institution is generally accepted as the requirement for entry into the teaching profession. Completion of this initial requirement for certification results from the favorable decision of two independent but complementary decision makers. Students must decide that they ought to be teachers, and teacher education institutions must decide that students may become teachers.

Before they apply for admission to teacher education, students decide, even if tentatively, to become teachers. Once admitted, they make a sequence of decisions related to their continued registration in teacher education, as well as those decisions that affect the quality of their performance in the curriculum. The decisions to remain in the teacher education program are made separately from and often independently of the decisions the college makes regarding students' retention.

Colleges and universities preparing teachers for the elementary and secondary schools establish selective admission policies as a means of accomplishing their stated purposes. Governed by such policies, colleges admit students who are most likely to complete a prescribed program, to accept teaching positions, and to function adequately as teachers. Applicants who will not attain these goals are identified and denied admission. For those admitted, a program of selective retention permits the institution to review the students' progress and to retain only those whose performance meets acceptable standards.

The importance of these individual and institutional decisions takes on new significance when it is realized that this sequence identifies the prerequisite steps in the process which places teachers in the classrooms of the public schools.

The Problem

The study reported here began because of the concern about the lack of available information to assist either the institution or the student in making the sequence of decisions necessary in teacher education. The problem was to describe the results of decision making so that the factors which operate in the selective retention of students in teacher education could be identified. It was felt that basic, fundamental research was needed to provide a description of the psychological factors that distinguish those who decided and were permitted to complete their required professional education from those who did not complete the program, either by their decision or that of the institution.

Specifically, the purpose of this research was to describe students in one teacher education institution, to describe them in such a way that factors affecting their selective retention could be identified. Such initial description would, it was felt, contribute to further understanding of the problems involved, for one of the values of descriptive research is its power to generate questions for further study. It was clearly recognized that if the study were to provide useful descriptions about the selective retention of students in teacher education and to be of heuristic value for further research, then particular attention had to be given the approach and the principles that guided the conduct of the study.

The Approach of the Study

The development of the framework for the Minnesota Studies of Student Personnel Work in Teacher Education, of which this study is a part, was based on five premises.

1) Colleges and universities preparing teachers implement their purposes for teacher education through the decisions they make about individuals. The principle points of decision making can be represented by admission, retention, and graduation. All three require that institutions decide about their students, and they do either by design or default.

2) Individuals who wish to become teachers implement their vocational goals through decisions they make about institutions. They must apply, enroll if admitted, and continue to graduation in a program of teacher education if they are to be certified for teaching.

3) Teachers entering the profession are the products of a sequence of interdependent decisions made by individuals and teacher education institutions. Individuals must apply; institutions must admit; individuals must register; institutions must retain; students must continue; institutions must graduate. An adverse decision by either the individual or the institution means that initital preparation for teaching cannot be completed.

4) In the education of teachers the optimum program recognizes that students and curriculums are equally important ingredients. Not all students who are admitted to a program of preparation for teaching *should* become teachers, and not all who are admitted *will* become teachers. Not all who should become teachers *will* benefit most from one program of courses or one method of presentation.

5) Acceptance of the four preceding premises implies that some implementation is required to facilitate the decision making of the individual and the institution. An adequate student personnel program is uniquely appropriate for this purpose. A student personnel program can be and should be designed which will carry out a commitment to individuals to facilitate their growth and development considering their personal goals and values, and to the institution as it develops a program to meet its objectives. Such a dual commitment to the individual and to the institution has, historically, been the objective of student personnel work, and it is particularly suitable for application to teacher education.

The theoretical model which most adequately integrates the stated premises is the decision theory model. Since the premises assume that both institutions and students and decision makers, the model may be applied to the decisions of either. The primary concern in this research, however, is in the decision making of the institution. Decision theory presents a model which represents the way in which decisions are made, identifies the essential elements in the process, describes their relationship to one another. Briefly, the model states that the decision maker has an objective or a purpose in mind. Data relevant to the decision are first collected. From these data estimates are made of the likelihood that various possible outcomes would result. Each alternative outcome is weighted by a value judgment which indicates its desirability when compared to the stated objective. The course of action is then chosen on the basis of the comparison of the several predicted outcomes and their associated values. Faced with a recurrence of decisions of a given kind, the decision maker seeks to establish a strategy, a rule, for decision making. A strategy is built from information regarding the outcome of past decisions. From these experiences the decision maker can learn the likelihood of occurrence of the various alternative outcomes and decide what data would be most useful in predicting these various outcomes. The strategy then states what decision will be made given certain data.

The role which the decision theory model has played in the research reported here has been, not so much to provide mathematical models for the solution of specific decision problems, but rather to guide the development of some principles which were important in the conduct of the research. The application of the mathematics of decision theory to the problems of this research would have been most difficult if not impossible to make, but the general structure of the model gave definition and direction to the study.

There are a number of guiding principles which have developed from the application of the decision theory model to the problem of studying selective retention in teacher education. The first of these principles states that the study of teacher education problems can logically begin with a focus on the student in the context of his college. This is not to suggest that studying students is an end in itself, but rather that this kind of research can lead to a number of areas of concern about the process or the program of teacher education.

The first principle states that the study of students should take place within the context of the institution, and a second guiding principle provides further definition. The curriculum major of students in teacher education is a relevant variable in any study of student or institutional decisions. This principle was suggested from the observation that the various curriculum majors in teacher education actually define different programs and environments for teaching and learning. In the conduct of the Minnesota Studies this principle has been followed. In any consideration of students the curriculum major is a primary classification variable; analyses of students are most appropriately made "within curriculums."

A third principle that guided the research was that decisions which individuals or institutions make should be studied longitudinally. Several factors influenced the acceptance of this principle. The outcomes of some decisions are actually contrary to long run purposes, particularly for individuals. Students, for example, may decide to withdraw from college for a quarter or a year, even though they are committed to finishing a program of teacher education. A cross-sectional study of a population could not reveal whether decisions to withdraw were temporary. In a longitudinal approach errors of misclassification caused by short term effects would be minimized. In addition, data must be representative, and it must be adequate. To be representative of institutional decisions, the results of decisions should be studied over a period of time. One further point, if sufficient numbers of cases are to be available for study "within curriculum majors", then most students will be required than enroll in a curriculum in any one given year. Longitudinal studies also permit the investigator to exercise better control over the data gathering process. Adequate specification and planning can prevent, in a large measure, the incomplete data which plague those who study decisions after the fact using whatever data are available.

A fourth guiding principle states that an evaluation of a program of teacher education can begin by studying the decisions that are made about students. The characteristics of the students who graduate, for example, result from the decisions of admission and retention and the effect of the course of the study. It would seem that an evaluation of a program could begin by comparing the characteristics of the graduates with the model which the institution believes is appropriate and desirable for students completing its program. Such a comparison should reveal whether the product of the institution is of the quality that the faculty desires. This principle does not suggest that studying students can or should replace a philosophical analysis of the curricular experiences, but it can suggest whether such an analysis would be desirable. Though the comparison may be undesirable to some, the decisions of an educational institution about its students are analogous to the purposes of quality control in industrial production. Its purpose is to describe the product at various stages of development in such a way that the producer can determine whether a product of a stated quality can result. Quality control does not determine the product nor establish the specifications for quality, but it does describe the results in terms of the dimensions of concern.

In summary the principles which have guided this investigation state that it is appropriate to study factors operative in the selection of students in teacher education by studying students. Such a study should be longitudinal and observe the curriculum major as a major variable of study. With this general discussion of the model and the guiding principles the discussion turns to a general statement of the problem studied and the types of variables that were of concern.

The Criterion and the Variables

The Criterion

From the discussion in the previous section, it should be clear that the choice which is made at any decision point is governed by the criterion, expressed or implied. Thus any descriptions of the decision making process or descriptions of the results of decision making must consider the criterion. Although the development of the criterion against which decisions are made may be an involved and arduous task, involving stating the purposes, developing curriculums which are consistent with the purposes, and specifying the students for whom the curriculums are intended, the application of the criterion requires simple and straightforward decisions. Each institution reduces its objectives to a series of clear-cut decisions: admit or reject; retain or drop; graduate or not graduate.

The study reported here chose to begin with the decisions the institution made as the criteria. From the point of view of the institution, retention or graduation describes the institution's decisions concerning the individual's status in teacher education. From the point of view of the individual, registration may be used to describe the individual's decisions about the program of teacher education. For purposes of this study two groups of students were identified, (1) those who chose to continue in teacher education and were permitted to remain in the institution, labeled persists, (2) those who chose not to continue or were not permitted to continue, called nonpersists.

Certainly such an operational criterion as persistence is not free from criticism. Teacher education institutions would be the first to suggest that such a criterion is not an adequate reflection of their purposes. "Teacher effectiveness," from many points of view, is a more desirable criterion. Since, however, this study was concerned with the characteristics which are associated with the individual and the institutional decisions relevant to teacher education, such a criterion did not seem to be essential. The decision of the institution to graduate or not to graduate is equivalent to deciding that an individual has or does not have the requisites for being an effective teacher. Graduation, or persistence, can be viewed as the necessary, though not sufficient, condition for being an effective teacher. Such an empirical approach is further strengthened by the fact that there is no general agreement as to what constitutes an effective teacher or how one can be reliably determined.

Persistence as a criterion has a number of attractive aspects. It is easily defined, it is reliable, and it is relevant to the purposes of the study. The records normally kept by any institution enable the criterion to be applied reliably to all subjects of the study. Persists can be defined as those who have completed the requirements of the institution at any given point, and since it is the purpose of the institution to produce graduates who are prepared to teach, such a criterion is relevant to the institutions' purposes. In addition, persistence as a criterion allows for institutional differences. Not all teacher education institutions agree on what constitutes the optimum program or process of preparing teachers for the schools. By accepting persistence as the criterion, any institution is able to study the results of its own decision making processes without being concerned as to whether such a criterion would be relevant to other institutions or to teacher education in general. A third advantage of the criterion of persistence is found in the fact that criterion is controlled by the institution. This fact gives stability and definition to the criterion. It must be recognized, however, that graduation is not a monolithic criterion. That is, it does not mean the same for all graduates. If a college or institution establishes different requirements for graduation from the various curriculums which it offers, then the criterion of graduation does not mean exactly the same for all graduates. Although this may at first seem to be a disadvantage, for purposes of this study it reinforces the notion that students must be studied within their curriculum major. When thus considered the advantages of the criterion include the fact that it has a good deal of specificity as well as being generally applicable.

In summary, the descriptions which were made to identify factors related to selective retention in teacher education were made against the criterion of persistence. Persistence was defined by the individual's continued registration in a program of teacher education and by the institution's permission to remain and to be graduated.

The Variables

Since the focus of this study was the student, the variables of concern were obtained from data regarding the student. In general, these data fall into three categories, biographical, academic, and psychometric. Since the study was designed to describe the results of the institution's decisions, it was decided that data which are normally collected as a part of the student personnel program at the College of Education would be the variables of concern, for these are the data available for assistance in decision making.

All students entering the College of Education provide certain kinds of biographical information. These include primarily their age, residence, high school attended, and sex, although some other biographical items are available after admission. For each student there are also available certain standard academic variables. These include the quality of performance in the school of last registration, whether it is some previous college or in high school, the number of previous college credits earned, and the probation record. Each student who applies to the University and to the program of teacher education completes a standard battery of psychometric tests as a part of his application for admission. These tests, described more completely in succeeding chapters, are given for the purpose of identifying scholastic aptitudes, certain areas of academic competence, as well as to provide measures of personality and interest.

More specifically, then, the problem for the research reported here was to identify those biographical, academic, and psychometric factors which are characteristic of those who persist in teacher education and those who do not.

Summary

Teacher education institutions decide who should be teachers either by design or default. The requirements for admission, retention, and graduation are operational definitions of institutional purpose. Individuals also decide whether they wish to become teachers through the decisions they make about institutions. The approach of this study was to use the decision theory model to identify and to relate the relevant variables. The purpose of the study is to describe the factors which operate in the selective retention of students in teacher education. Persistence was accepted as the criterion and the study focused on student biographical, academic, and pyschometric characteristics. Ensuing chapters give further definition to the setting in which the research was conducted, the research program of which this study was a part, and the variables and procedures used in the study.

Chapter II

The Setting of the Study

The College and Its Point of View

The College of Education at the University of Minnesota is one of the several colleges and professional schools located on the Minneapolis campus. The University is a state controlled, land grant institution governed by a board of regents elected by the state legislature. The Board of Regents has given the College of Education authority to determine its own admission standards, its curriculums, and its graduation requirements. College policy is established by recommendation of standing committees and approved by the faculty at its regular meetings.

A major purpose of the College of Education is to prepare teachers for the elementary and secondary schools. To realize this purpose, the College seeks to admit those students who are most likely to complete a degree program, to accept teaching positions, and to function adequately as teachers. It also seeks to identify and deny admission to those students who are not likely to attain these goals. The responsibility for the competence of its graduates lies with the College. This responsibility is to the pupils who will be taught by graduates of the College, to society, to the profession, and to the students preparing to teach. The pupils, the society, and the profession have a right to expect that the teacher be competent in the field he teaches and be able to maintain a classroom atmosphere favorable to learning. Students preparing to teach have a right to expect that if the College permits them to continue, they have a reasonable chance to earn a college degree and to succeed in teaching. This responsibility to students in teacher education does not permit them to prepare for teaching when such a preparation may seem best for them but would not be the best for those they might teach.

The College admits from high school those students who wish to prepare to teach art, music, physical education, business, or industrial arts. All others, except those who wish to teach home economics and agriculture, regularly enter the College of Science, Literature, and the Arts from high school. The Elementary Education majors transfer to the College of Education after one successful year in the liberal arts college; others transfer after the two-year, pre-education program. Home Economics and Agriculture majors must complete two successful years in the College of Agriculture, Forestry, and Home Economics before admission, and then they register jointly in that college and the College of Education. Students seeking preparation in Nursing Education enter the College of Education after completing nurses training, and then they complete three years in the College. The College also admits students with a B.A. or B.S. degree who wish to prepare for Elementary Education or for Nursery, Kindergarten, Primary Education. Table 2.1 lists all the undergraduate majors in the College of Education according to the educational prerequisite for admission.

Table 2.1

Undergraduate Majors in the College of Education Leading to the B. S. Degree Grouped by Educational Prerequisites for Admission

ALL FOUR YEARS IN COLLEGE OF EDUCATION 1. Art Education 2. Business and Distributive Education 3. Industrial Education 4. Music Education 5. Physical Education for Men 6. Physical Education for Women 7. Recreation Leadership	FIRST YEAR IN COLLEGE OF SCIENCE, LITERATURE, AND THE ARTS 1. Elementary 2. Nursery, Kindergarten, Primary 3. Special Education for Exceptional Children Plus three years in the College of Education
FIRST TWO YEARS IN COLLEGE OF S.L.A. 1. Core 2. English 3. Foreign Languages 4. Language Arts 5. Mathematics 6. Natural Science 7. Physical Science 8. Social Studies 9. Speech 10. Speech Pathology Plus two years in the College of Education	FIRST TWO YEARS IN COLLEGE OF AGRICULTURE, FORESTRY, AND HOME ECONOMICS 1. Agriculture Education 2. Home Economics Education Plus two years combined registration with the College of Education
FIRST YEAR IN NURSES TRAINING 1. Nursing Education Plus three years in the College of Education	B.S. OR B.A. DEGREE 1. Elementary Education 2. Nursery-Kindergarten-Primary Plus one year in the College of Education

In all of the curriculums of the College, the freshmen and sophomore years are viewed as pre-professional years. Professional training for teaching begins in the junior year with a sequence of courses which includes educational psychology and introduction to the school. During the junior year students participate in a laboratory experience with school age children in a community agency where they work under the supervision of a professional member of the agency staff. Student teaching and special methods are included in the professional sequence during the senior year.

Underlying the total program of the College is the point of view that the College can carry out its responsibility in the preparation of teachers only if it selects the students it admits and retains. Only when students can meet the specified standards are they admitted, and only when their performance in the College is satisfactory are they retained and graduated. These functions of selective admission and selective retention are the assigned responsibilities of the Student Personnel Office, except for the evaluation of student teaching, which is the responsibility of the Student Teaching Office.

The Student Personnel Office and Its Functions

The Student Personnel Office in the College of Education has two primary functions which are of concern here: (1) to assist the College in making its decisions about the selection and retention of individuals, and (2) to assist individuals in making their decision about teaching as a vocation. Emphasis will be given in this discussion to the first of these two functions.

Before a program of selective admission and selective retention can be effective, a number of conditions must be present. These prerequisites are presented before a more detailed discussion of the way in which the two functions are carried out in the College of Education. Necessary conditions in an adequate selection program include the following:

1) the control of admission and retention in the hands of those charged with the preparation of teachers

2) adequate records that are inclusive, organized, and convenient for staff use

3) selection activities that are shared by those who are affected by them, and who must take action based on the decisions made

4) staff members who are well prepared in student personnel work to coordinate the program, supervise the records, and counsel with students

5) college and community agencies to which students may be referred for special assistance as needed

6) organization that ties the program to faculty and administrative structures so that those who administer it are responsible to faculty thinking and policy, have access to faculty resources, and keep faculty informed of the program

7) **a willingness on the part of the faculty, although recognizing they are subject to human error, to deny continuation of the program to academically able students whom they believe should not be working in a classroom with students**

8) **a systematic method for reviewing established procedures that operate for all students.**

Program of Selective Admission

Figure 2.1 has been prepared to illustrate the points of institutional decision in the selection program of the College of Education. The program of selective admission is concerned both with the admission of students to the junior sequence of professional courses and with admission to the College in those curriculums where students are admitted prior to the junior year. Students admitted directly from high school must rank in the top 60 percent of their high school class. Students transferring to the College of Education to major in elementary education must have a C average (2.0 GPA) in specified work in composition, science, and social science, and a C average in their total program. Students who were admitted to the College from high school or prior to the beginning of the junior year must make application for admission to the first sequence of professional courses given during the junior year. Majors in secondary academic subjects who enter the College and the junior year at the same time, must have a C average in their total record and a C+ average (2.5 GPA) in courses of their intended teaching major. Agriculture teaching majors must have a 2.3 GPA in their agriculture courses at the time of admission, but must present a 2.5 GPA for graduation. A sequence of activities are required as part of this admissions process. Students take a battery of psychological tests, talk with a counselor in the Student Personnel Office, take a speech and hearing test, complete a physical examination, and have an interview with a faculty advisor.

The psychological tests which are required for junior admission, regardless of whether students were previously enrolled in the College or are transferring from another school, are the Miller Analogies Test, form A, the Cooperative Reading Test, form C-2-R, the Minnesota Teacher Attitude Inventory, and the Minnesota Multiphasic Personality Inventory. There are no cutting scores on any of these tests or inventories, but all are used as a part of the composite of information affecting the decision made by the admissions committee.

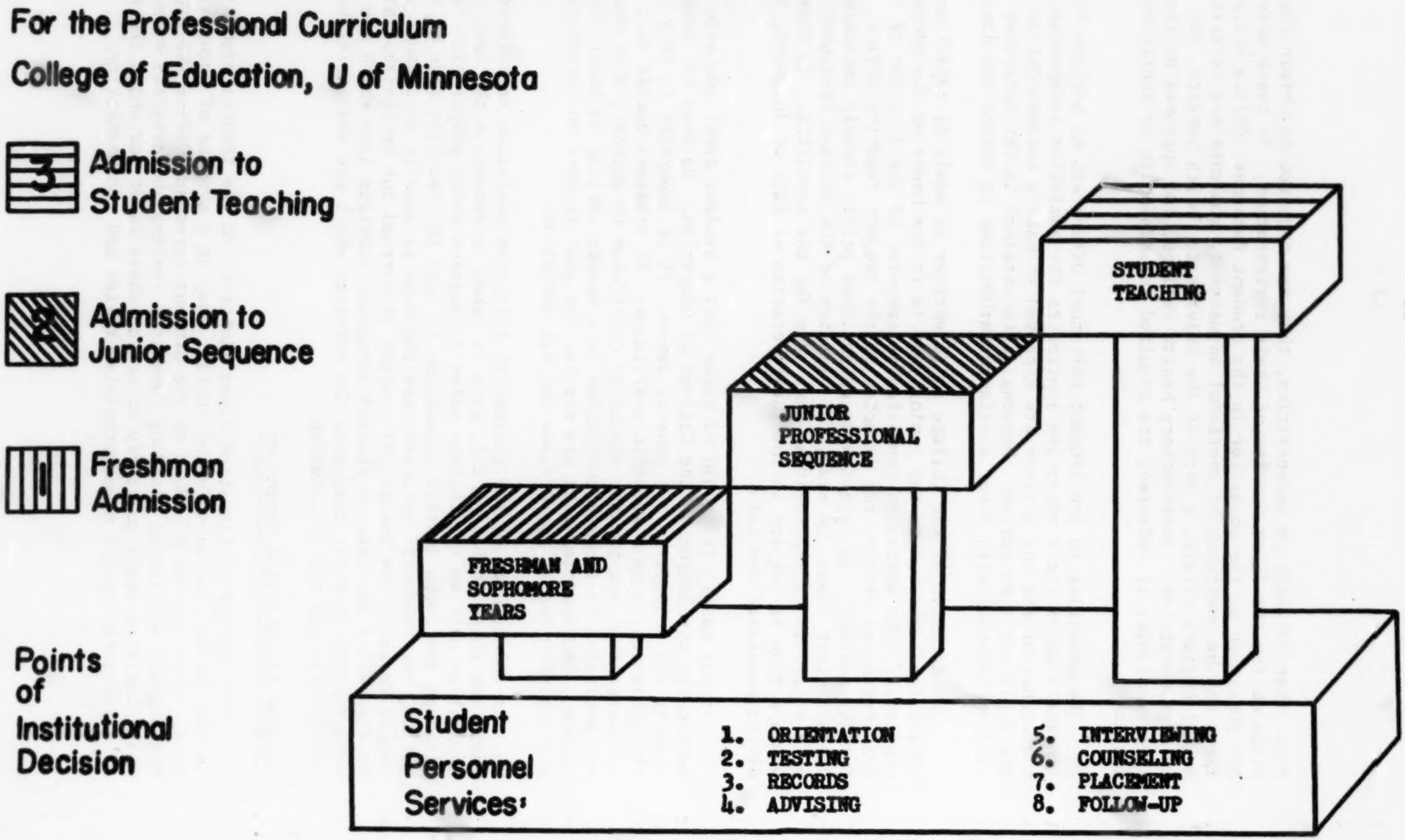
The speech and hearing examination is designed and administered by the Speech and Hearing Clinic of the University to screen applicants for the College of Education. Students may be given a rating indicating satisfactory speech, a need for remedial work, or an unsatisfactory rating which is sufficient reason for denying admission to the College.

All students are also given a physical examination to learn whether they have any health problems that would preclude a career in teaching. Although freshmen receive such an examination shortly after their admission to the University, students seeking admission to the junior year are examined prior to approval of their application. In the case of transfer students coming

Figure 2.1

College of Education Student Personnel Services in the Programs of Selective Admission and Selective Retention with the Points of Institutional Decision Indicated.

Student Personnel Services
in
Selective Admission & Selective Retention


For the Professional Curriculum
College of Education, U of Minnesota
3 Admission to Student Teaching
2 Admission to Junior Sequence
1 Freshman Admission
Points of Institutional Decision
FRESHMAN AND SOPHOMORE YEARS
JUNIOR PROFESSIONAL SEQUENCE
STUDENT TEACHING
Student Personnel Services:
1. ORIENTATION
2. TESTING
3. RECORDS
4. ADVISING
5. INTERVIEWING
6. COUNSELING
7. PLACEMENT
8. FOLLOW-UP

from other colleges or universities, they are required to obtain the examination during the first quarter of their registration. In those cases where the physician or the counselor in the Student Personnel Office believe that there may be questions of emotional adjustment, students are referred to the mental hygiene clinic, a part of the University Health Service, for appraisal by a psychiatrist. Satisfactory health ratings, and approval by the mental hygiene clinic, if referred, are required for admission or continued registration.

The counselor in the Student Personnel Office and an advisor from the student's major field interview applicants for admission independently. Both the counselor and the advisor are expected to make a recommendation concerning the applicant's admission. Personal data obtained in the interview are considered together with other available information in making the decision.

The decision of the College as to whether to admit or reject an application for admission to the junior year is in the hands of the admission committee. The admission committee is composed of the director of the Student Personnel Office, the director of the Student Teaching Office, and the faculty advisor. In cases where established policy clearly indicates the decision that should be made, the director of the Student Personnel Office or a staff member representing him, acts for the committee. In those cases where action is subject to the interpretation of data or judgment, the committee considers the case.

In all cases, it should be clear that a student seeks admission to a particular curriculum in the College of Education. He does not seek admission to the College in any general sense. It is important to this study that the admission is to a specific curriculum. If students decide that they wish to change from one teacher education curriculum to another, they must apply for admission to the new curriculum in a manner similar to their first application. Each quarter data are checked for each student to determine whether his registration is appropriate for his admission.

In the conduct of the program of selective admission represented by the first two steps in Figure 2.1, care is taken to recognize the fact that the student as well as the College makes a decision about preparation for teaching. Although the focus in this discussion is upon the decision made by the institution, the students' decisions are regarded as equally important, and the manner in which the admissions program is carried out recognizes this fact. In Figure 2.1 the base of student personnel services upon which the program of selection is built indicates the services which are available for both individuals and the institution.

Program of Selective Retention

The College of Education views admission to the teacher education program in the junior year as only the initial step in a program of sequential selection. Each quarter a member of the Student Personnel Office who represents the Student Scholastic Standing Committee reviews the progress of each student. This Committee meets quarterly to act on those cases for which the application of established policy needs committee review and recommendation.

The progress of each student in teacher education is thoroughly reviewed before his entrance into student teaching. This is the third major decision point indicated in Figure 2.1. All students must make formal application for student teaching. The application is reviewed by the Student Teaching Office to determine whether the student meets the academic, health, and speech requirements for admission to student teaching. The application is then sent for review to the Student Personnel Office, the faculty advisor, and the instructor in the junior year professional sequence. On the basis of their observations of the student's performance since his admission, each reviewer makes a recommendation regarding admission to student teaching. If any one questions the admission, a case conference is called by the director of the Student Teaching Office. Members of the case conference committee are the student's major advisor, a representative of the Student Personnel Office, an instructor from the junior year sequence, the director of the Bureau of Recommendations, and the director of the Student Teaching Office who chairs the conference. This committee, on the basis of observations and judgments, may decide to (1) reject the application for student teaching, (2) to postpone the admission until certain prerequisites are completed, (3) to accept the student for student teaching under certain conditions, or (4) to give an unqualified admission to student teaching.

The student teaching experience itself is also an opportunity for the evaluation of a student's performance. Should questions arise as to the students adequacy, a case conference is called, and a decision is made as to whether the student should be allowed to continue.

Throughout the processes of selection and retention, it is the policy of the College to inform the student at the earliest possible time if there is any question about the adequacy of his performance or the desirability of his continuing in the program. The Student Personnel Office is always available to work with students who of their own volition raise questions about their continuation in teacher education.

The final step in the process of selective retention is at the point of application for graduation. As at all of the other decision points, the student makes formal application to the College for the conferring of the degree. The College makes a written reply to the student giving him his status with regard to the requirements for the degree. Upon completion of the remaining requirements, the degree is conferred and the student is recommended to the State Department of Education for certification.

Summary

The selection of students for teacher education by the College of Education at the University of Minnesota may be viewed as a program of admission and retention that calls for a series of decisions by the College and by each student. The point of decision is set to coincide with established administrative and curricular practices. At the first point the student applies for admission to a college at the University. Second, the Scholastic Standing Committee of his college examines the grade records at the end of each quarter. Third, the student not previously registered in the College of Education applies for admission upon completing the pre-education curriculum. Fourth, the student applies for admission to the professional education sequence in the junior year. In the case of majors in secondary academic fields, the previous two steps are accomplished at the same time. Fifth, students apply for admission to student teaching. Sixth, the student applies for graduation. Check points to insure that students have been approved for admission to the next step in the program are provided within the established registration procedures of the College. Each step in this selection sequence, except for the quarterly review of students' grades, calls for formal application on the part of the student. It also calls for a formal response from the College, notifying the student of the action taken and recognizing the accomplishment of those whose applications are approved. The review of the student's record at each step includes an examination of information available at the time of earlier review plus information that had become available since the last review. Having completed a discussion of the general problems studied and the setting in which the study was made, this report now turns to a more specific discussion of this research project and of the research program of which it is a part.

Chapter III

The Study in Perspective

The Minnesota Studies of Student Personnel Work in Teacher Education

In the two previous chapters the point of view and the functions of the Student Personnel Office in the College of Education were presented. These views have evolved from continued evaluation of a program which has developed over a period of years. It has become increasingly clear that if student personnel work makes the assumption that two of its functions are to assist in individual and institutional decision making, then research should be added as another essential function. The decision making process requires a program of continuous research and evaluation if it is to be effective in accomplishing the objectives of the decision maker.

The development of the research program of the Student Personnel Office came with the recognition that the research function must be an integral part of the entire program. This recognition was accompanied by the belief that the research cannot be performed incidentally by staff who already have full-time responsibilities. The first step came with the allocation of a half-time research appointment to the Student Personnel Office with the assignment to develop a program of student personnel research.

The Minnesota Studies of Student Personnel Work in Teacher Education were conceived as a means of studying and improving the student personnel work through research. Following are a list of questions which are examples of the questions which have stimulated the development of the program.

> What are the normative characteristics of the data gathered as information for the decision making process?
>
> What criteria are the most relevant to the purpose of the decision maker?
>
> What information or data are most useful predictors of the criterion?
>
> How are values used in the weighting of information gathered?
>
> In what pattern or sequence should the data be gathered for application to the decision making situation?
>
> What inferences may be made about the institution's system of values based on the institutional decisions made?

These questions suggest the whole gamut of research questions that faced the research staff as they applied the decision theory to the student personnel program. Where then to begin? From the outset it was decided that the main stream of the developing research program should be a longitudinal, descriptive study of the results of the institution's decisions about students and student's decisions about teacher education. By gathering data over a period of time, several important questions could be answered. Charting the decisions would result in actuarial data about the graduation rate. It would make possible the building of prediction tables for each of the types of information gathered, and it would permit a study which could make inferences about the value system of the decision maker from a study of the products of the decisions.

Although the longitudinal study of students was established as the long term continuing effort of basic importance, it could not serve the entire research needs. To supplement this continued program, shorter studies were designed to answer different types of questions. Even though some of these questions have also been of a descriptive nature, some have been experimental. The purpose of these shorter studies has been to utilize the population of the students who are a part of the longitudinal study to answer other questions that cannot be approached by the longitudinal method.

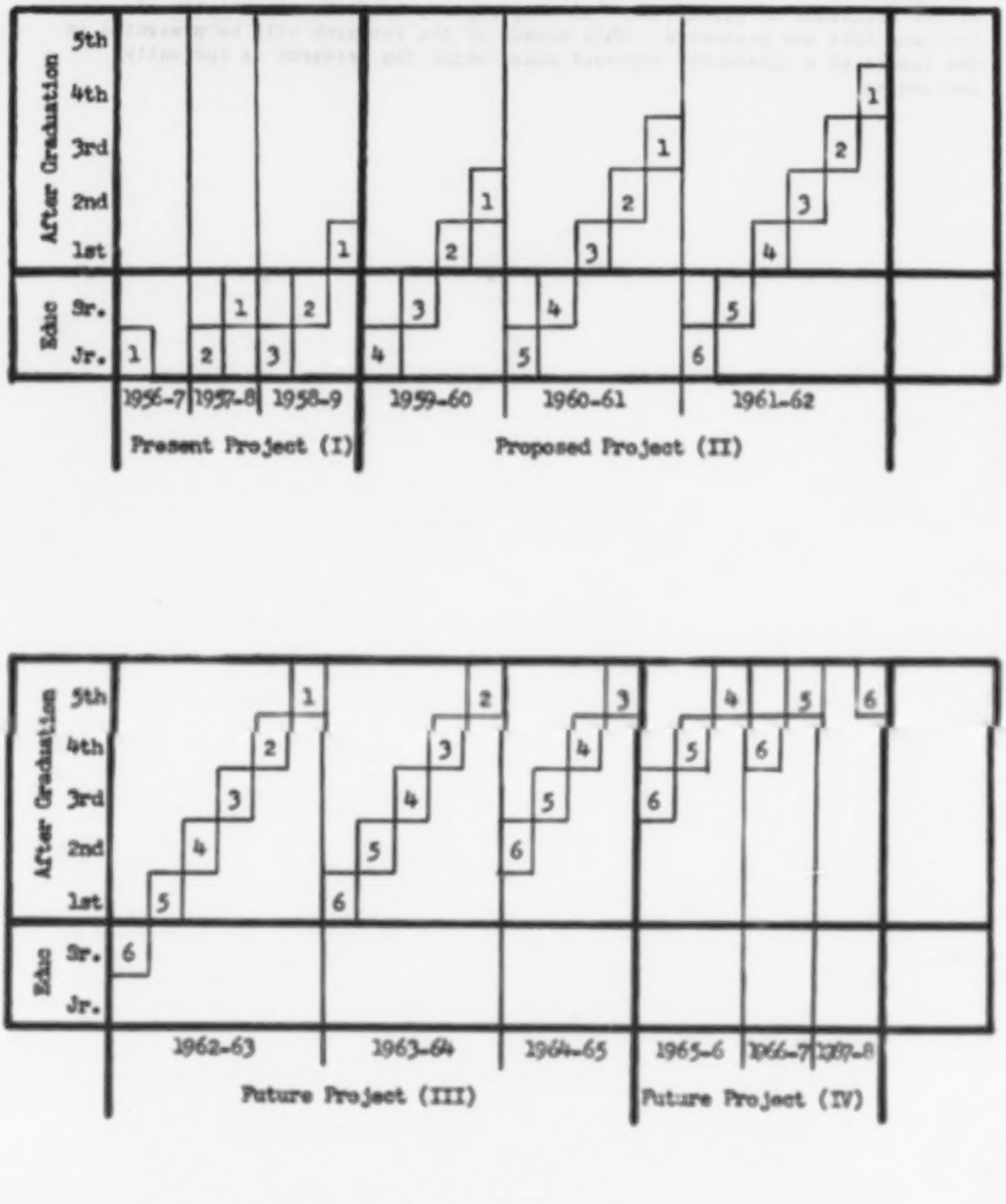
The Twelve-Year Study

When the study reported here was first conceived, application was made for funds to support the first three years of an anticipated ten-year study. As the overall plan for a longitudinal study developed, changes were made in the original plan. A modification in the present study was made through an amendment to the research contract extending the time of the contract from three to four years.

Figure 3.1 illustrates the present pattern which is being followed in the longitudinal study. Basically this figure shows the stages year by year of six entering junior classes during their two years of preparation for teacher education and for five years following their graduation. To complete the five-year followup of six entering junior classes requires a period of twelve years. Thus, the twelve-year study. An immediate question is, why six classes and why five years beyond graduation? One of the basic premises upon which this study was built recognized the need to consider each *curriculum major as a separate* population. Data concerning men and women within the same curriculum major must be analyzed separately from other curriculums whenever possible. From the enrollment data in the various major fields in the College of Education, it was determined that a period of six years would be required to accumulate samples of sufficient size to perform the desired statistical analysis. The five years beyond graduation was arbitrarily set as a time period within which a graduate would probably have entered teaching if he intended to at all. Because of the current patterns of mobility in our society, the current military obligation of men, and other similar factors, it was recognized early that not all who would become teachers would enter the teaching field immediately upon graduation. It was felt, however, that within five years after graduation, nearly all of those who intend to enter the field will have an opportunity to do so. It was recognized, however, that some women will not enter teaching until after they are married and their children have reached school age. The span of five years after graduation may well be too short a time to find whether or not these women enter teaching. Nevertheless, the five year period will be sufficient for nearly all of the population.

Figure 3.1

The projected twelve year longitudinal study (1956-68) by the College of Education of six consecutive junior classes from entrance to five years following graduation.


After Graduation
5th
4th
3rd
2nd
1st
Educ
Sr.
Jr.
1956-7
1957-8
1958-9
1959-60
1960-61
1961-62
Present Project (I)
Proposed Project (II)
1962-63
1963-64
1964-65
1965-6
1966-7
1967-8
Future Project (III)
Future Project (IV)

A part of the design of the twelve-year study included the followup of the graduates of the College of Education for five years beyond graduation. The primary goal of this followup is to determine whether or not graduates actually enter teaching. From these data it will be possible to use entrance into teaching as the criterion against which descriptions can be made as well as the criterion of graduation. In this report, however, no analyses of followup data are presented. This aspect of the research will be presented in the report of a subsequent contract under which the research is currently proceeding.

Chapter IV

The Population, the Data, and the Hypotheses

The Population

Identifying the Population

Because the fundamental purpose of this study was to describe the retention of students in a teacher education program, the definition of the population was formulated with specific reference to entrance into the sequence of professional courses. In Chapter II the description of the teacher education program in the College of Education states that students are not considered to have entered professional preparation for teaching officially until they are admitted to the first sequence of professional courses, Education 55A-B for secondary and special field majors and Education 75A-B for elementary majors, given at the junior level. Students in all curriculums, regardless of the point at which they are admitted to the College of Education, must have completed the appropriate selective admission requirements, as described in Chapter II, before they are permitted to enter the first professional course. Thus, a student was included in the population studied if he was enrolled in the first sequence of professional courses during the period studied, fall, 1956 through spring, 1959.

The method used for designating the beginning of professional preparation ignores the point of admission into the College and only considers whether the number of credits completed, a traditional index of academic status, meets the minimum required. Chapter II indicates that the admission to the College, though always made on the basis of specified criteria for selection, comes at different points in the academic career of students, depending on their major teaching field. Because of the variability in the time of admission from curriculum to curriculum, and because of the uniform designation of entrance into the professional sequence, the latter gives a more consistent and meaningful definition for identifying entering students. Such a definition does not completely omit consideration of credits completed. The number and pattern of credits completed are included as a part of the requirement for entering the professional sequence. Credits beyond the minimum required, however, cannot, in most cases, appreciably shorten the time necessary to complete the professional sequence required for graduation.

The System of Student Personnel Records

The Student Personnel Office has always maintained a system of personnel records for students in the College as well as for those who seek admission. The purpose for keeping these records has been to facilitate the several personnel functions of the College discussed previously. Though the official academic records are maintained by the Office of Admissions and Records, the College depends upon the Student Personnel Office for information about the current academic status of its students. In addition, the office maintains records of interviews, psychometric tests, biographical data, correspondence, and other records that are essential for such personnel functions as selection, retention, and advising.

When research was officially added to the functions of the Student Personnel Office, the requirements which such a function imposes on student personnel records were a first consideration. The primary demands which research makes on student personnel records are two: completeness and accessibility of information. Complete records provide information on the current status of a student at any given time, and they record the important events in his history related to admission, registration, and retention. Accessible records readily provide information for the use of the student and the College, but accessibility needs to be extended further to meet the needs of research. Information must be readily available for and amenable to research analyses.

To accomplish these purposes of completeness and accessibility there must be a system of record keeping that identifies the sources of essential information, and organizes the recording process according to the flow of the information which is required in the performance of other student personnel functions. Job descriptions and filing systems are the end result of the organization of information and the operations performed with the information.

An assessment of the system of student personnel records in use prior to the beginning of this study led to the conclusion that modifications needed to be made. The needed changes were found in the system of keeping records rather than in information gathered. The research design required no "new" information about students, but it did require more rigorous adherence to the completeness criterion and some adjustments to increase the accessibility of information. Changes did need to be made in the means by which information was originated, transmitted, recorded, and filed. Much of the time allotted to this project during its first year was devoted to the development of a system of records and a flow of information which met the requirements of the research function as well as the normal operations of the student personnel office. The form of the records, the job classification of office personnel, and the system of filing and maintenance of records were all studied and the necessary adjustments were made. A short description of the system which was inaugurated follows.

The system of student personnel records which was installed depends upon a central control record. After careful investigation of a number of types of records, a marginally punched card was the type chosen. The card as developed was printed by the E-Z Sort Company and is shown in Figure 4.1. All information about students that comes to the Student Personnel Office, which is required as a part of the admission, registration, or retention processes, is routed to the records clerk who is charged with the responsibility of maintaining the card. Information is posted on the interior of the card and is also represented by designated punches on an edge of the card. The processes which involve the card or information pertinent to the card are defined and described in a manual which was developed to standardize the procedures and to specify the appropriate time in the university calendar when each process should be completed.

This Student Personnel Control Card, the E-Z Sort Card, is initiated when the student applies for admission to the College and is placed in a pending file. When a decision is made on the application, the action of admission or rejection is entered on the card. Those rejected and those admitted who do not subsequently register by a designated date are placed in the inactive file. Those who do register become a part of the active file. At specified times when the College makes requirements of its students or applicants, the control card is used as the record of the completion of the requirements. Incomplete requirements are routinely checked, and existing policies determine the action for non-compliance. For example, students transferring to the College of Education from another college on campus must apply and then complete the procedures described in Chapter II before the admission decision is made. Failure to complete all of the requirements means that admission is not granted. For students registered in the College, the established policy states that a student's registration may be canceled or that permission to re-register may be withheld for non-compliance with the College's requests for information.

In addition to the development of the E-Z Sort Card, the research staff worked with the Office of Admissions and Records and the Student Counseling Bureau to make other necessary changes. With the cooperation of Admissions and Records, the registration blanks were revised to include additional information necessary to maintain the current file of control cards. Working with the Student Counseling Bureau, which conducts the testing programs for the various colleges, the method of reporting test scores was altered and new forms were designed.

The most significant single change in the procedures was the assignment of a code number to each student at the time of admission. The code is an eight digit number that identifies the quarter and year the student was admitted, the curriculum major, and a number to give an alphabetic deisngation within the major field for the quarter and year admitted. Code changes are made only when the student changes his major, and this happens infrequently, for students must seek admission to another curriculum as they did admission to the first curriculum. The decision to use some code designation was based on the need for a meaningful numerical designation for students that could be used in the machine processing of data. It was not feasible to use the existing code number assigned by Admissions and Records, for it is a longer code designation and has no relation to college, curriculum or date of admission.

Three records served as the basic documents for the analysis of data reported here: the control card, the report of test scores from the Student Counseling Bureau, and the official college transcript from the Office of Admissions and Records. From these records the populations were identified, and they are described in the following sections.

The Three Entering Classes

Previously in this chapter the definitions were given which served as the basis for including students in this study. Although the special definitions given need to be kept in mind, this discussion identifies members of the three entering classes as "juniors." In order to give a summary picture of the three classes which began their professional programs during the three years studied, Table 4.1 is presented. By convention, the College of Education divides its population of students into those enrolled in elementary, secondary, and special fields. The total number of students for the three year period was 2388. Of the 745 who were juniors during the 1956-57 year, 46% were students in the elementary curriculums. Students in these curriculums accounted for approximately the same percentage of the 816 who were juniors in the 1957-58 year. Elementary juniors dropped to 41% of the total 826 who were juniors in the 1958-59 year. Even though the total number of juniors increased each year, only two of the groups in Table 4.1 followed this pattern, the males in elementary, and females in secondary education. The other groups, except the males in secondary fields, had largest enrollments in the 1957-58 year.

Table 4.1

The Number and Percent of Male and Female Students Who Were Juniors in Elementary, Secondary and Special Fields During Each of the Three Years Studied

	1956-57		1957-58		1958-59		Total	
	N	%	N	%	N	%	N	%
Elementary								
Male	31	4	42	5	52	6	125	5
Female	315	42	323	40	286	35	924	39
Secondary								
Male	125	17	104	13	151	18	380	16
Female	77	10	99	12	114	14	290	12
Special Fields								
Male	109	15	124	15	108	13	341	14
Female	88	12	125	15	115	14	328	14
Total	745	100	816	100	826	100	2388	100

In general over the three years studied, majors in elementary education constituted over 40% of the total enrollment of juniors, and the remaining number was evenly divided among the secondary and special fields.

Elementary Curriculums. Table 4.2 presents the number and percent of male and female students who were juniors in each of the six elementary education curriculums during the three years studied. In the College of Education the elementary education curriculum consists of two programs, one of which emphasizes early childhood education and the other emphasizes the general field of elementary education. The curriculums designated with an "A" are those which prepare teachers for the elementary grades in general; those designated with "B" are those which specialize in Nursery, Primary, Kindergarten education. The curriculums are further designated by I, II, and III. Curriculums designated by "I" are those which, during the period studied, were four-year programs for students following the typical pattern of college attendance. Curriculums designated by "II" are for those who are qualified to teach in the elementary grades on the basis of the completion of two years of normal school education, and who are now completing the B.S. degree in Education. This curriculum was established because the state certification requirements were changed so that all those teaching with two-year preparation were required to complete a degree program. The two curriculums with the designation "III" are programs which were inaugurated to provide teacher education for those who had already completed a bachelor's degree in another field and wished to prepare to teach in the elementary grades. This program is one which normally requires one full year of study, and the student is awarded the B.S. degree in education upon the completion of the requirements.

Table 4.2

The Number and Percent of Male and Female Students Who Were Juniors in Elementary Education During Each of the Three Years Studied

	1956-57		1957-58		1958-59		Total	
	N	%	N	%	N	%	N	%
Elementary IA								
Male	26	11	36	14	41	17	103	14
Female	211	89	215	86	199	83	625	86
Total	237	100	251	100	240	100	728	100
Elementary IIA								
Male	2	10	0	0	1	8	3	6
Female	19	90	16	100	12	92	47	94
Total	21	100	16	100	13	100	50	100
Elementary IIIA								
Male	3	11	6	19	8	21	17	18
Female	24	89	26	81	30	79	80	82
Total	27	100	32	100	38	100	97	100
Elementary IB								
Male	0	0	0	0	2	5	2	1
Female	54	100	55	100	40	95	149	99
Total	54	100	55	100	42	100	151	100
Elementary IIB								
Male	0	0	0	0	0	0	0	0
Female	2	100	1	100	2	100	5	100
Total	2	100	1	100	2	100	5	100
Elementary IIIB								
Male	0	0	0	0	0	0	0	0
Female	5	100	10	100	0	100	0	0
Female	5	100	10	100	3	100	18	100
Total	5	100	10	100	3	100	18	100

From the data in Table 4.2, it is apparent that over 80% of the students in the elementary curriculums were the IA and IB majors who were pursuing programs which are typical of college students in general. This is not to suggest that the 50 or so students who entered the IIA, IIIA, IIB, and IIIB curriculums each year are not an important part of the total elementary program. It does suggest, however, that studies of selective retention of those in the normal college programs have relevance for a larger proportion of the elementary majors. The enrollment trend in these elementary curriculums showed an increase from the first year to the second, and then a decrease from the second year to the third. Contrary to the general trend, the men in the IA program and both the men and women in the IIIA program showed a consistent increase in the three years. Although the numbers in these cases are not large, it may well be that it is becoming more acceptable for men to prepare for elementary school teaching. It may also indicate that there is more of a tendency to return to college for another degree when there has been a change of vocational direction. The decrease in the number of IIA students is to be expected in that each year there will be fewer teachers who have not yet completed the degree requirements.

Secondary Academic. Majors in the several secondary academic curriculums which are listed as a part of Table 4.3 are students who normally spend two years obtaining the necessary arts and sciences prerequisites to permit them to transfer into the College of Education for their two final college years. In most of the curriculums, the requirements for teaching majors have been determined by the College of Education in cooperation with those in the appropriate departments of the College of Science, Literature, and the Arts. In some cases, staff members of the SLA departments hold appointments in the College of Education and serve as advisors for students whose major field is in their department. The major responsibility, however, for the program and its development, rests with a senior member of the College of Education staff.

As was noted in Table 4.1, there was a general trend over the years for the number of men in secondary academic fields to decrease from the first to the second year and then increase from the second to the third year. A notable exception to this pattern in Table 4.3 are those men who were juniors in Mathematics over the three years studied. The number of juniors majoring in Math Education increased each year and more than doubled from the first to the third year. As was previously noted, the number of women in the secondary academic fields generally increased each year over the three year period. Table 4.3 shows that the English, Math, Natural Science, and Social Science majors follow this general trend. In Table 4.3 the data regarding the Core and Physical Science majors needs special comment. The Core program, as the data would suggest, is one which is being discontinued as a secondary academic major and the Physical Science program is one which is relatively new, and during the period studied it was just beginning to attract a number of students.

Special Fields. All of the curriculums identified in Table 4.4, with the

Special Fields. All of the curriculums identified in Table 4.4, with the exception of Recreation II and Nursing Education curriculums, are available as four-year curriculums in the College of Education, and students may enter directly from high school if they were in the upper sixty percent of their high school class. Students wishing to major in the program identified as Recreation II transfer to the College of Education after two prerequisite years in the General College. Those in the Nursing Education program are admitted after completing their nurses training, for which they are given 45 blanket college credits. It should also be noted that those in the Recreation II program follow a special curriculum for work outside the public schools, and are not recommended for certification for teaching.

Table 4.4 indicates that there is, with the exception of the Recreation programs, little variability in the number of juniors in each program over the three-year period. In most of the curriculums the number of juniors increased in 1957-58 over the previous year and then decreased in the third year. The notable exceptions to this trend were the men in Industrial Education where the registration continued to increase, and the third year's enrollment was one-third more than that of the first year. The number of juniors in the Nursing Education program doubled in the second year but showed some decrease

Table 4.3

The Number and Percent of Male and Female Students Who Were Juniors in Secondary Academic Fields During Each of the Three Years Studied

	1956-57		1957-58		1958-59		Total	
	N	%	N	%	N	%	N	%
Core								
Male	10	62	1	25	1	100	12	57
Female	6	38	3	75	0	0	9	43
Total	16	100	4	100	1	100	21	100
English								
Male	13	37	5	16	11	24	29	26
Female	22	63	27	84	35	76	84	74
Total	35	100	32	100	46	100	113	100
Foreign Languages								
Male	6	30	5	28	8	36	19	32
Female	14	70	13	72	14	64	41	68
Total	20	100	18	100	22	100	60	100
Language Arts								
Male	0	0	1	9	4	29	5	14
Female	10	100	10	91	10	71	30	86
Total	10	100	11	100	14	100	35	100
Mathematics								
Male	17	85	25	78	40	78	82	80
Female	3	15	7	22	11	22	21	20
Total	20	100	32	100	51	100	103	100
Natural Science								
Male	21	91	15	68	26	76	62	78
Female	2	9	7	32	8	24	17	22
Total	23	100	22	100	34	100	79	100
Physical Science								
Male	0	-	2	100	12	92	14	93
Female	0	-	0	-	1	8	1	7
Total	0	-	2	100	13	100	15	100
Social Science								
Male	46	85	41	80	38	66	125	77
Female	8	15	10	20	20	34	38	23
Total	54	100	51	100	58	100	163	100
Speech								
Male	7	44	7	47	10	56	24	49
Female	9	56	8	53	8	44	25	51
Total	16	100	15	100	18	100	49	100
Speech Pathology								
Male	5	62	2	12	1	12	8	25
Female	3	38	14	88	7	88	24	75
Total	8	100	16	100	8	100	32	100

Table 4.4

The Number and Percent of Male and Female Students Who Were Juniors in Special Fields During Each of the Three Years Studied

	1956-57		1957-58		1958-59		Total	
	N	%	N	%	N	%	N	%
Art								
Male	10	31	7	23	7	27	24	27
Female	22	69	24	77	19	73	65	73
Total	32	100	31	100	26	100	89	100
Business								
Male	14	64	14	64	11	48	39	58
Female	8	36	8	36	12	52	28	42
Total	22	100	22	100	23	100	67	100
Industrial								
Male	30	100	34	100	41	100	105	100
Female	0	0	0	0	0	0	0	0
Total	30	100	34	100	41	100	105	100
Music								
Male	9	43	14	47	9	43	32	44
Female	12	57	16	53	12	57	40	56
Total	21	100	30	100	21	100	72	100
PEM								
Male	30	100	32	100	33	100	95	100
Female	0	0	0	0	0	0	0	0
Total	30	100	32	100	33	100	95	100
PEW								
Male	0	0	0	0	0	0	0	0
Female	12	100	31	100	30	100	73	100
Total	12	100	31	100	30	100	73	100
Recreation I								
Male	3	30	8	57	1	17	12	40
Female	7	70	6	43	5	83	18	60
Total	10	100	14	100	6	100	30	100
Recreation II								
Male	12	55	15	88	6	46	33	63
Female	10	45	2	12	7	54	19	37
Total	22	100	17	100	13	100	52	100
Nursing Education								
Male	1	6	0	0	0	0	1	1
Female	17	94	38	100	30	100	85	99
Total	18	100	38	100	30	100	86	100

Table 4.5

The Number and Percent of Male and Female Persists and Nonpersists in Elementary, Secondary, and Special Fields for the Three Year Period 1956-1959

	Persists		Nonpersists		Total	
	N	%	N	%	N	%
Elementary						
Male	107	86	18	14	125	100
Female	805	87	119	13	924	100
Secondary						
Male	306	81	74	19	380	100
Female	240	83	50	17	290	100
Special Fields						
Male	289	85	52	15	341	100
Female	273	83	55	17	328	100
Total	2020	85	368	15	2388	100

in the third year. Most of the curriculums tend to attract a relatively stable number of students year after year.

The Criterion Groups

This study had as one of its purposes to apply the criterion of persistence to the population and study its affect upon those who entered the three junior classes. To be classified as "persists", students either were graduated during the three years studied or were registered and completed the spring quarter, 1959, in the College of Education. Juniors in the 1956-57 class would normally have graduated in the spring, 1958, and those juniors in the 1957-58 class would normally have graduated at the end of spring, 1959. Juniors in the third class, 1958-59, would normally have completed their junior year by the end of spring, 1959. Thus, the group of persists is composed both of graduates and those who were actively pursuing a program of teacher education. It is recognized that some of those who were registered and were classed as persists at the close of spring, 1959, would, in due time, be classified as nonpersists. This fact is recognized and the necessary adjustments will be made in future analyses which are made covering longer periods of time.

Table 4.5 presents the number and percent of male and female persists and nonpersists in the elementary, secondary, and special fields totaled over the three year period. On the average, for all majors, 15% of the total were classified as nonpersists. The lowest nonpersist rate was found for female elementary majors, 13%, and the highest for male secondary majors, 19%. With the exception of the female elementary majors, the number of nonpersists in any area is not large.

Some adjustments of the original purposes of this study were necessary when the small numbers of nonpersists were found. After some remarks about the nonpersist rate in each of the fields, there will be a discussion of the adjustments which were made in the samples studied so that reasonable conclusions could be drawn without violating the principles which guided the study.

Elementary. Table 4.6 presents the persistence data for students in each Elementary curriculum summed over the three year period. When each of the Elementary majors was viewed separately, a somewhat different picture of persistence emerged than when all six curriculums were considered together, (Table 4.5). Table 4.6 indicates that a much higher nonpersist rate occurred in the Elementary IIA and IIB curriculums, although the total numbers in the latter curriculum are quite small. In general, the nonpersist rate was higher for men than for women and was lowest for women in the IA, IB, and IIIA programs. The highest rate of nonpersistence was noted in those who, having completed a normal school certificate program, were returning for the completion of the B.S. degree. It must be noted, however, that the numbers in these curriculums were smaller, and these students are, for the most part, teachers-in-service who take courses intermittently.

Secondary Academic. In Table 4.7 the number of nonpersists in each of the secondary academic curriculum categories was, in some cases, quite small. In only a few curriculums are the numbers of sufficient size to be able to place some confidence in a nonpersist rate. The highest nonpersist rate for men occurred among Speech, Social Science, and Core majors. Among the women, the Math, Natural Science, and Speech majors were most likely to be nonpersists. Notably low in the percent of nonpersists were those with Foreign Language, Language Arts, and Physical Science majors.

Special Fields. Though the numbers in each of the categories for special fields was very often small, as indicated in Table 4.8, some interesting results can be seen. With sizable enrollments in both Industrial Education and Nursing Education, the number of nonpersists was notably small. Women in Art and Music and men in the Recreation II and the Business fields had higher than average nonpersist rates. Men in Art Education had the lowest nonpersist rate.

Groups Selected for Analyses

In outlining the principles which guided this research, Chapter I stated that students should be studied within their curriculum major, and students in these majors should be studied over a period of time. When the three entering classes were identified, and when the criterion of persistence was applied to these classes, the number in many of the curriculums, especially nonpersists, was quite small. Before extensive analyses were performed, a decision was made to limit the analysis to those groups which had a sufficient number of students to produce meaningful results. It was also decided that some compromise could be made in the method of analysis without abandoning the principles which had guided the collection of data. From a knowledge of the students and the curriculums, it was decided that English, Speech, and Language Arts majors might be combined. It also seemed reasonable to combine students in the Mathematics and Science curriculums. It did not seem reasonable, in view of the study's purposes, that men and women should be combined even with a curriculum.

Table 4.6

The Number and Percent of Male and Female Persists and Nonpersists in Elementary Education over the Three Year Period 1956-1959

	Persist		Nonpersist		Total	
	N	%	N	%	N	%
Elementary IA						
Male	89	86	14	14	103	100
Female	552	88	73	12	625	100
Total	641	88	87	12	728	100
Elementary IIA						
Male	2	67	1	33	3	100
Female	33	70	14	30	47	100
Total	35	70	15	30	50	100
Elementary IIIA						
Male	14	82	3	18	17	100
Female	70	88	10	12	80	100
Total	84	87	13	13	97	100
Elementary IB						
Male	2	100	0	0	2	100
Female	134	90	15	10	149	100
Total	136	90	15	10	151	100
Elementary IIB						
Male	0	-	0	-	0	
Female	2	40	3	60	5	100
Total	2	40	3	60	5	100
Elementary IIIB						
Male	0	-	0	-	0	-
Female	14	78	4	22	18	100
Total	14	78	4	22	18	100

Table 4.7

The Number and Percent of Male and Female Persists and Nonpersists in Secondary Academic Fields over the Three Year Period 1956-1959

	Persist		Nonpersist		Total	
	N	%	N	%	N	%
Core						
Male	9	75	3	25	12	100
Female	6	67	3	33	9	100
Total	15	71	6	29	21	100
English						
Male	24	83	5	17	29	100
Female	69	82	15	18	84	100
Total	93	82	20	18	113	100
Foreign Languages						
Male	17	89	2	11	19	100
Female	37	90	4	10	41	100
Total	54	90	6	10	60	100
Language Arts						
Male	5	100	0	0	5	100
Female	27	90	3	10	30	100
Total	32	91	3	0	35	100
Mathematics						
Male	72	88	10	12	82	100
Female	12	57	9	43	21	100
Total	84	82	19	18	103	100
Natural Science						
Male	52	84	10	16	62	100
Female	13	76	4	24	17	100
Total	65	82	14	18	79	100
Physical Science						
Male	13	93	1	7	14	100
Female	1	100	0	0	1	100
Total	14	93	1	7	15	100
Social Science						
Male	91	73	34	27	125	100
Female	32	84	6	16	38	100
Total	123	75	40	25	163	100
Speech						
Male	17	71	7	29	24	100
Female	20	80	5	20	25	100
Total	37	76	12	24	49	100
Speech Pathology						
Male	6	75	2	25	8	100
Female	23	96	1	4	24	100
Total	29	91	3	9	32	100

Table 4.8

The Number and Percent of Male and Female Persists and Nonpersists in Special Fields over the Three Year Period 1956-1959

	Persist		Nonpersist		Total	
	N	%	N	%	N	%
Art						
Male	23	96	1	4	24	100
Female	48	74	17	26	65	100
Total	71	80	18	20	89	100
Business						
Male	31	79	8	21	39	100
Female	24	86	4	14	28	100
Total	55	82	12	18	67	100
Industrial						
Male	96	91	9	9	105	100
Female	0	0	0	0	0	0
Total	96	91	0	9	105	100
Music						
Male	27	84	5	16	32	100
Female	32	80	8	20	40	100
Total	59	82	13	18	72	100
PEM						
Male	78	82	17	18	95	100
Female	0	0	0	0	0	0
Total	78	82	17	18	95	100
PEW						
Male	0	0	0	0	0	0
Female	60	82	13	18	73	100
Total	60	82	13	18	73	100
Recreation I						
Male	11	92	1	8	12	100
Female	16	89	2	11	18	100
Total	27	90	3	10	30	100
Recreation II						
Male	22	67	11	33	33	100
Female	16	84	3	16	19	100
Total	38	73	14	27	52	100
Nursing Education						
Male	1	100	0	0	1	100
Female	77	91	8	9	85	100
Total	78	91	8	9	86	100

As a result of the decisions to combine two groups of curriculums, to keep men and women separate, and to analyze only the data on groups having a reasonable sample size, four groups were chosen for analysis. The groups were Elementary IA women; English, Speech, and Language Arts women; Social Studies men; and Math-Science men. Because each of the three entering classes of Elementary IA women were of sufficient size, it was decided that additional analyses would compare these three classes. The other three groups were not sufficiently large to warrant a year-by-year comparison. In these cases, all of the students entering the curriculums during the three years studied became a part of the sample.

Because this study was primarily descriptive and exploratory, it was decided that the maximum information should be available from the sample. In order to accomplish this purpose with the data processing equipment and the computers available for use, complete data on each individual in the sample was required. Investigators had to decide whether the analysis would be completed with larger numbers of students having complete data on a smaller number of variables, or a smaller number of students having complete data on a larger number of variables. The latter alternative was chosen and the samples in the four groups were reduced in size to the number in each analysis group having complete data. Table 4.9 presents the size of the sample in each of the analysis groups. Although some of the numbers of nonpersists are small, it was felt they were adequate to serve the purposes of an exploratory study. In the following sections of this chapter, the data which were chosen for analysis are presented and the hypotheses tested are stated.

Table 4.9

The Number of Persists and Nonpersists Among Elementary Women in Three Classes, English, Speech and Language Arts Women, Math-Science Men, and Social Studies Men Who Entered the College of Education Between Fall, 1956 and Spring, 1959, for Whom Analyses Were Completed

	Elementary Women				Eng.Sp.&L.A. Women	Math-Sci. Men	Soc.St. Men
	56-7	57-8	58-9	Total			
Persists	141	134	160	435	89	111	78
Nonpersists	15	30	13	58	20	18	25
Total	156	164	173	493	109	129	103

The Data

The presentation of the fourteen variables which were analyzed in this study are presented under three headings. The biographical variables identify certain information about the student which are a part of his history as a student. The psychometric variables are primarily standardized tests administered in the high school or college setting. The academic variables are those which indicate the student's quality of academic work. The definitions given and the manner of securing the data in each of these areas are presented in succeeding sections.

Biographical Data

Biographical items chosen for study were those which, with the exception of age, were concerned with previous educational experiences. These data were available from transcripts or applications for admission to the University.

School of Prior Registration. The purpose of this variable was to describe the type of school which the student attended prior to admission to the College of Education. A student may have come to the College from high school, from an off campus college, or from one of the units of the University of Minnesota. If the student transferred to the College of Education from another institution, that college or university was classified as to whether it was a junior college, a state teachers' college, a liberal arts college, a technical school, or a professional school. Students transferring to the College of Education from an on campus unit of the University were classified by the college from which they transferred.

Level of Prior Preparation. This item was devised so that students could be classified in terms of the number of college credits which they had completed at the time of entry into the College of Education, regardless of whether they came as a freshman or with advanced standing. For students coming with previous college work, all credits earned prior to entry into the College were totaled and the student was classified as an advanced standing freshman (0-40 quarter credits), as a sophomore (41-85 quarter credits), as a junior (86-130 quarter credits), or as a senior (over 130 quarter credits). Students with previous degrees were considered as advanced standing seniors, because no more than 135 quarter credits can be transferred toward a degree.

Earlier in this report the pattern of requirements for admission to each of the curriculums was presented. The purpose of this biographical item in the data collection was to permit a study of the credits completed at the time of admission into the curriculums as compared with the normal requirements for admission as specified in the College bulletin.

Size and Type of High School. To permit a description of the high school backgrounds of College of Education students, the high school which each College of Education student attended was classified by size and type. Seven categories were used for classification, six for those who attended Minnesota high schools and one for out of state schools. A graduate of a Minnesota high school was first classified according to whether he came from a public or private school, and then each school was further classified by enrollment as small, medium, or large. Public schools with an enrollment of over 2,000 in the top three grades were classed as large; those with 1,000-2,000 in the top three grades were classed as medium sized; and those whose enrollment was under 1,000 in the top three grades were labeled small. Categorization by size was made differently for the private schools. A private school was considered large if its enrollment in the top three grades was over 1,000; of medium size if the enrollment was between 450 and 1,000; and small if the enrollment was under 450. School enrollment data were obtained from the State Department of Education.

Size of Community. This variable was included to permit a study of the size of the community in which College of Education students attended high school. Although the size of the high school and the size of the community are certainly related, it was felt that there were important educational reasons to distinguish between urban, suburban, city, and town as the location of the high school. High schools in Minneapolis, St. Paul, or Duluth were labeled urban, and those adjacent to Minneapolis or St. Paul were classed as suburban. Cities were defined as those non-urban, non-suburban communities with more than 20,000 people. Towns were defined as those communities having between 10,000 and 20,000 people; and a separate category was used for those towns with less than 10,000 people. Because they were so few in number and classification was difficult, out of state residents were all classified together irrespective of community size. 1950 census figures were used to obtain population figures.

Age. The year of birth was recorded as reported on the University transcript. Before the variable was used in any computations, however, it was translated to the age in years at the time the student enrolled in the first professional sequence in Education.

Psychometric Data

High School Rank (HSR). High school percentile rank is most appropriately defined as a measure of high school achievement as indicated by the standing in the high school class. High school rank data are reported to colleges in Minnesota as a part of the information gathered during the state-wide testing program. It is commonly used as a predictor of college achievement, and its relation to other psychometric measures is always of interest. For these reasons it is included under the heading of psychometric data in this study.

American Council on Education Psychological Examination (ACE). The ACE is commonly known, and was widely used as a measure of scholastic ability in high school and entering college students during the period of this study.

Miller Analogies Test (MAT). The MAT is a verbal analogies test designed to measure scholastic aptitude, and, during the period studied, was administered to all juniors in the College of Education before they took the first professional course in education.

Cooperative Reading Test (Reading). This variable was defined as the scores made on Cooperative Reading Test, Form C2R, a standardized measure of reading comprehension.

Minnesota Teacher Attitude Inventory (MTAI). The MTAI is a widely used test of attitudes toward various aspects of teaching and activities related to it, and the variable used in this study was the score in this test made by juniors in the College of Education. As a convenience in the interpretation of scores, a constant of 500 is added to the raw score when it is reported. The scores used in this study had the constant added.

Academic Data

The academic variables in this study were selected because they described several aspects of the quality of the student's academic performance either in the College of Education or prior to his admission.

Transfer Grade Point Average (Transfer GPA). This variable is defined as the grade point average earned by the student in college level courses taken before he entered the College of Education. The scale used was A = 4, B = 3, C = 2, D = 1, F = 0.

Ed 55-75 GPA. This grade point average, based on the same scale as the previous one, describes the quality of the work which a student did in the first professional course in the College of Education. Ed 55 and Ed 75 are the course numbers for the beginning courses for secondary and elementary majors. These courses have been described in an earlier chapter in this report.

Over-all GPA. This index was computed as an indication of the over-all quality of a student's work. It was determined at the end of spring quarter, 1959, and all those courses which the student had taken since he had been admitted to the College of Education were included in the computations.

Probation. This variable was used to describe the current and previous status combined of the student with regard to academic probation. Students were classified as to whether they had ever been on scholastic probation since being admitted to the University of Minnesota, whether they were placed on scholastic probation in the College of Education, and what their status was at the end of spring quarter, 1959. Students were placed in one of the following five categories: 1) never on probation, 2) on probation in the College of Education, but made up honor points and was removed from probation, 3) on probation before entering the College of Education, but never on probation in Education, 4) on probation in Education and was dropped or withdrew while on probation, and 5) on probation and continuing as a student as of the end of spring quarter, 1959.

The Hypotheses

Chapter I stated that the purpose of this study was to describe students in teacher education in such a way that factors associated with their selective retention could be identified. The contract which guided this research presented three general hypotheses to be tested concerning three types of data, biographical, psychometric, and academic. The proposed hypotheses were concerned with testing the differences between those who continued in teacher education and those who did not. The hypotheses actually tested, as specified later in this section, make the comparisons proposed, and they go considerably beyond the scope of the general statements in the contract. A number of the additional hypotheses tested concerned multivariate comparisons of the curriculums studied. These multivariate questions were investigated and are reported in lieu of the item analysis studies suggested in the contract. As the project progressed, the investigators decided that the multivariate comparisons should be made to provide a more adequate description of the groups studied rather than performing analyses to answer more specific, refined questions, requiring item analyses.

The concept of the criterion presented in Chapter I, though it is formulated somewhat differently than the contract statement, contains all the essential elements stated in the contract. All of the criterion data as specified were collected in the course of the study, but analyses of the relation between the predictor variables and success in student teaching and entrance into the profession have been deferred until there are larger numbers of students in each curriculum for whom these data are available. By the end of spring, 1959, too few of those who had completed student teaching were classed as nonpersists, and only the first junior class had graduated and entered teaching.

The presentation of the hypotheses tested in this study follows in three parts. Because the number of Elementary IA women in each junior class was sufficiently large to permit comparisons among the three classes, more extensive analyses were completed on these data. These hypotheses concerning the Elementary IA women are presented first.

The set of hypotheses which were the basis for the analysis of English, Speech, and Language Arts women, Social Studies men, and Math-Science men are presented second. The third set specifies those hypotheses that were concerned with the comparison of all curriculum groups simultaneously. Throughout this section the presentation of the hypotheses takes the form of general descriptive questions rather than stating them in the null or statistical form.

Elementary IA Women

The biographical, psychometric and academic data were used in formulating three sets of questions about Elementary IA women. The first concerned descriptive comparisons of the three entering classes. The second concerned comparisons of persists and nonpersists. Both of these sets of questions were limited to univariate or bivariate data. The third set asked the multivariate questions.

The descriptive questions asked about the three entering classes of Elementary IA women follow.

1. Did the three entering classes come from different backgrounds of experience as indicated by the biographical items?
2. Did the three classes have different psychometric characteristics as indicated by scores on those variables?
3. Did those persons in the three classes who transferred from other universities differ in the quality of previous college work?

These questions ask whether the three entering junior classes were alike or different on the biographical, psychometric, and academic variables. The biographical variables, being primarily categorical, were compared for the three different classes by means of the Chi square test of independence. To answer the question regarding the psychometric data the means and variances of the three classes were compared. In addition, the correlations between each pair of the psychometric variables were tested to see whether they were larger than could have been expected by chance. For the one academic variable available at the time of admission, the transfer grade point average, the means and variances of the classes were compared.

The criterion groups, the persists and nonpersists, added another dimension to comparison of entering classes. The form of the statements of hypotheses are the same as those above with the criterion added.

1. Did the persists and nonpersists in the three classes come from different experience backgrounds as indicated by the biographical items?

2. Did the persists and nonpersists in the three classes have different characteristics as measured by scores on the psychometric variables?

3. Did the persists and nonpersists in the three classes have different academic characteristics as measured by the quality of their college achievement?

These questions required a comparison of persists with nonpersists and comparisons among the three classes. In the analysis of the biographical variables this was accomplished by comparing the persists and nonpersists separately in each class, and then the test statistics which indicated the magnitude of the relationship for each class were compared to give an indication of whether the strength of the relationship was different for the three classes. For the psychometric data the comparisons of persists and nonpersists were made independently of the comparisons among classes. Tests of hypotheses concerning the means, variances, and correlation coefficients were made to compare persists with nonpersists in each class and, in addition, a comparison was made to indicate whether each of the criterion groups were different from class to class. Correlations were tested for differences between persists and nonpersists in a given year. The comparisons made on academic data followed the same pattern of comparisons of the criterion groups within a class and each criterion compared separately from class to class.

The third set of descriptive questions about Elementary IA women are different from the previous sets primarily in that they are multivariate in nature rather than univariate or bivariate. These questions were two.

1. Considering all of the biographical, psychometric, and academic data available at the time of admission, are persists different from nonpersists?

2. Considering all of the biographical, psychometric, and academic data available at the time of admission and data indicating subsequent performance in the College of Education, are the persists different from the nonpersists?

These two questions differ only in the data upon which the comparisons were made. The first question asks whether entrance data can distinguish persists and nonpersists. The second asks whether all the data available at the termination of the study, entrance data and performance data, can distinguish persists from nonpersists. Stated another way these are questions of classification. Can students be classified as persists or nonpersists on the basis of the data? As in the case of previous analyses the questions were asked of each junior class separately. The linear discriminant function was the statistical technique employed to test the hypotheses.

Three Secondary Academic Groups

The three groups for whom data were analyzed in addition to the Elementary IA majors were all secondary academic majors: English, Speech, and Language Arts women combined; Social Studies men; and Math and Science men combined. For each major the numbers in the three junior classes were not large, so the analyses combined the three classes into one. This, of course, eliminated the class as a dimension in the analyses. The analyses of these three groups were conducted to answer three general questions. (Each question combines the biographical, psychometric, and academic variables, since the form of the separate questions has been presented in the previous section.)

1. What are the biographical, psychometric, and academic characteristics of the group?

2. Did the persists differ from the nonpersists when compared on each of the biographical, psychometric, and academic variables?

3. Did the persists differ from the nonpersists when all of the biographical, psychometric, and academic variables are considered simultaneously?

Since the first question is a normative one it was answered in terms of percentages, means, standard deviations and correlation coefficients. The second question was answered by the appropriate tests of significance, considering each variable separately. The answer to the third question required a multivariate solution, the linear discriminant function, for it asks whether persists and nonpersists can be effectively classified considering all the variables at once. In answering this multivariate question for these three groups, as with the Elementary IA group, two different analyses were made. One determined whether the variables available at entrance could be used for effective classification, and the other made the same determination using all data available.

Chapters 6, 7, and 8 present the analyses for these groups, one chapter devoted to each group. Each chapter is divided into three major sections, which present the analyses which are appropriate to answer the three general questions presented above.

The Four Curriculums Compared

The purpose for including the joint questions asked concerning all four curriculums, which were not posed in the original contract, are two-fold. It was felt that additional comparative data were needed to complete the descriptions which the study set out to make. In addition, such analyses would provide important information regarding an assumption basic to the conception and conduct of this study. The assumption stated that there are significant differences among students in teacher education who have majors in different teaching fields. Another assumption stated that there are important differences between men and women in the same field. Although this study provides no comparisons of men and women in the same curriculum it does provide comparative data among curriculums. Even though the four groups studied were two groups of women and two groups of men, rather than all of one sex, the analyses made possible comparisons important to this study, and it has implications for other studies of a similar nature.

Regarding the four curriculums, this study asked three general questions.

1. Were the students who entered the four curriculum groups different on the various biographical, psychometric, and academic variables?

2. When the groups were classified as persists or nonpersists according to the criterion, were there biographical, psychometric, or academic differences among the curriculum groups?

3. Were there differences among those who persisted in the four curriculums considering simultaneously all of the variables which were available at the time of admission?

To answer the first question required the univariate and bivariate comparisons among the four groups. Appropriate parametric and nonparametric tests of significance were used to determine these differences. Answering the second question required similar analyses except that the entering group was divided into persists and nonpersists and the differences between them were investigated in addition to the comparisons among the curriculums. The third question, in addition to its multivariate nature, is of a different character. This question asks whether admissions data can effectively classify the persists in the four groups. Asked another way: can the admissions data be used in making effective distinctions among those who persist in the four groups studied? An affirmative answer to this question requires distinguishable differences among the patterns of data that characterize the groups. The generalized distance function was the statistical technique used to determine whether all of the combined admissions data could effectively distinguish among the groups studied.

Summary

This chapter begins with a presentation of the population of students who entered the College of Education during three academic years, 1956-1959. A description of the system of personnel records which was developed to permit a rigorous control of the data gathering process follows. From the total population studied, the chapter describes the four groups selected for analysis and presents the fourteen variables which comprise the biographical, psychometric, and academic data for the study. The concluding section presents the questions which the study sought to answer. These questions, in general, ask whether there are differences in elementary students from year to year, between persists and nonpersists in the various curriculums, and whether there are differences in the characteristics of students in the various curriculums. The five chapters which follow this one present the analyses appropriate to the specific questions asked of each of the four curriculum groups and those which require the comparison of the four groups.

Chapter V

Women in the Elementary IA Curriculum

Introduction

This chapter begins with a brief description of the Elementary IA Curriculum in the College of Education at the University of Minnesota, after which the analyses of data are presented. The presentation of data is divided into three major sections. In the first of these, the three classes of entering juniors are described and compared on each of the biographical, psychometric, and achievement variables. In the second, each of the three classes is divided into two groups using a criterion of persistence as the basis. As described in a previous chapter, a student was classified as a "persist" or a "nonpersist" according to his status at the end of the spring quarter, 1959. If the student had graduated by spring, 1959, or was enrolled in the College during spring, 1959, he was classified as a persist. If the student was not enrolled, had withdrawn, had been dropped, or had transferred to another college of the University, he was classified as a nonpersist. The analysis compares persists with nonpersists on each of the biographical, psychometric, and academic variables for each of the three classes of entering juniors.

In the third section of the analysis the multivariate analysis is applied to the criterion groups. The purpose of this analysis is to determine if the three kinds of variables can be used effectively in combination to distinguish between persists and nonpersists. In this section the discriminant analysis is performed in two different ways for each of the three junior classes. The first analysis utilizes data which were available for all students upon entrance into the junior year. The question of concern is: Can the persists and nonpersists be distinguished at the time of entrance on the basis of the data available at that time? The second analysis employs all data available at the time that the student left the College or at the termination of the study. The question in this case is: Can persists be distinguished from nonpersists on the basis of entrance data combined with the data relevant to their performance in college?

Although some summary and interpretation of the data is given in this chapter, the major discussion of these results is presented in Part III of this research report.

The Elementary IA Curriculum

During the years included in this study, 1956-1959, the Elementary IA curriculum was considered a four-year program in the College of Education. Although there were provisions for entrance at other times, the curriculum was established so that a typical student entered after graduation from high school if he was in the upper 60 percent of his high school class. The program of study for the first two years involved courses in the fields of the liberal arts, except for pre-professional courses in art education and music education. Students were not permitted to enroll in the first professional course in teacher education until the completion of their sophomore year.

In addition to requiring two years of liberal arts education prior to enrolling the the professional sequence of courses, each student was required to apply for admission to the junior year. This application for admission required that the student take a battery of psychometric tests, obtain a physical examination, a speech and hearing examination, and have an interview with a counselor in the Student Personnel Office and with a faculty adviser. If the student's grade record was adequate, and if he was judged to be a person suitable for teaching, he was admitted. During the junior year, the student enrolled in the first of the professional sequence of courses, which included educational psychology and introduction to the elementary school. Upon completion of this sequence, students might enroll in any of the special methods of teaching courses which were required. At the end of the junior year the student applied for admission to student teaching. At this point his record was again reviewed, and the decision was made whether or not he should be admitted to student teaching. Upon successful completion of the student teaching and the academic work, the College of Education recommended the student for certification by the State Department of Education.

The IA program as described above was only one of three programs offered for students interested in the general field of elementary education. Students involved in this analysis do not include those in the other two curriculums who were completing a bachelor's degree after a normal school certificate and elementary school teaching experience or those who entered the program with a bachelor's degree in another field. As was previously mentioned, students became a part of this study when they entered the junior year and the first professional sequence of courses. The study does not include those who entered at the freshman or sophomore years unless they were a part of the group who began the junior year in one of the three years studied.

Three Entering Classes Described and Compared

Biographical Data

In Table 5.1 the three classes of juniors in the Elementary IA curriculum are classified according to the school in which they were registered prior to their entrance into the College of Education. The data indicate that nearly half of the students transferred to the College of Education from another unit within the University of Minnesota. One-fourth of the total group came to the College of Education directly from high school, and about 30 percent came from other colleges and universities. The Chi square test of independence indicates that the proportion of students entering from the three types of schools remained relatively constant for the three classes studied. Although the relationship between the class and the school of prior registration was not significant, it can be noted that the percent of students transferring from on campus from year to year was more stable than the percent coming either from high schools or from off campus.

To examine the level of preparation completed by the Elementary IA students before they entered the College of Education, the data presented in Table 5.2 were collected. As was indicated in the previous table, about one-fourth of the students who began the junior year in the three years studied entered the College as freshmen with no previous college work. Of those students who entered with advanced standing, less than five percent had completed forty or fewer college credits, classifying them as freshmen. Nearly thirty percent of the group had completed between 41 and 85 credits and were classed as sophomores. About forty percent of the group had completed between 86 and 135 credits and were designated as juniors. Only four percent had completed more than 135 credits and were designated as seniors. The Chi square test indicated that there was a significant relationship between the level of prior preparation and the year of entry, indicating that the proportions in each of the categories of level of preparation did not remain stable from year to year. The large Chi square value was caused by the fluctuations in the proportion of those

Table 5.1

School of Prior Registration of Three Junior Classes of Women in the Elementary IA Program by Academic Year

Year	High School		On Campus Transfers		Off Campus Transfers		Total	
	N	%	N	%	N	%	N	%
1956-57	50	32.1	72	46.2	34	21.8	156	100
1957-58	36	22.0	70	42.7	58	35.3	164	100
1958-59	42	24.3	78	45.1	53	30.6	173	100
Total	128	25.9	220	44.6	145	29.4	493	100

$\chi^2 = 8.84$ n.s.

Table 5.2

Level of Prior Preparation of Three Junior Classes of Women in the Elementary IA Program by Academic Year

Year		High School	Fr.	Soph.	Advanced Standing Jr.	Sr.	Total
1956-57	N	50	6	38	56	6	156
	%	32.0	3.8	24.4	35.9	3.8	100
1957-58	N	35	3	54	62	9	163
	%	21.5	1.8	33.1	38.0	5.5	100
1958-59	N	42	14	49	68	2	175
	%	24.0	8.0	28.0	38.8	1.1	100
Total	N	127	23	141	186	17	494
	%	25.7	4.6	28.5	37.6	3.4	100

$\chi^2 = 18.27^*$

* significant at .05 level

coming from high school, as advanced standing freshmen, and as advanced standing seniors. The percent entering at the sophomore and junior level remained quite constant over the three years. Most of the differences occurred in the 57-58 class and the 58-59 class.

Data from Table 5.2 indicate that only one-third of the Elementary IA students studied entered the program as beginning freshmen or during the freshman year. About fory percent of the three classes studied entered at the junior level or beyond. Thus, even though the curriculum was designed as a four-year program, it was not functioning as such.

The next two tables describe the high school background of the students in the IA program. In Table 5.3 the size and type of high school from which the women graduated are presented for each of the three academic years. High schools were classified as public or private and according to the enrollment in the top six grades of the high school. The table indicates that fifty-seven percent of the total in the three classes attended large public high schools. One-third of the group graduated from medium-sized or small public schools with only one woman in ten graduating from a private high school of any size. The Chi square test applied to these data indicated that the proportion of elementary women who attended the various sizes and types of high schools did not change significantly from year to year.

Table 5.4 contributes further to the understanding of the high school background of these women. Although the classification of high school by size and type is closely related to the size of the community in which they were located, Table 5.4 provides additional information about the location of the large high school and the medium-sized school. This table indicates that for the three junior classes studied, slightly over one-half of the women came from urban high schools. The "urban" classification included the city high schools of Minneapolis, St. Paul, and Duluth. Only one student in eight graduated from a suburban high school located in the area surrounding the metropolitan Twin Cities. Over one-fourth of the group graduated from high schools located in communities of less than 1,000 population. The Chi square test indicates that the proportions for each of the three classes of juniors were relatively constant.

It is noteworthy that the number of elementary women who came from suburban high schools was only one-fourth the number from urban schools; yet the number of students attending suburban high schools is approximately three-fourths as large as those attending urban high schools. It seems quite clear that the Elementary IA program at the University did not have the drawing power for graduates of suburban high schools that it did for those in city high schools. It is interesting to note that the graduates of urban high schools and high schools in communities of less than 10,000 population account for eight out of every ten women in the IA program over the three years studied.

The data in Table 5.5 were prepared to give a picture of the age distribution of the women in the Elementary IA program at the time they began their first professional course in the junior year. The typical age for the students studied was 20 years. Slightly over sixty percent of the group studied were 20 years of age as they began the junior year, and nearly nine out of ten were in the 19-21 age group. It is significant, however, to note that one person in ten was more than two years older than the typical age and that one in twenty was as many as five years older than the typical person in the group. A Chi

Table 5.3

Size and Type of High School from which Three Junior Classes of Women in the Elementary 1A Program Graduated from by Academic Year

Year		Public High Schools			Private High Schools				
		>2,000	1-2,000	<1,000	>1,000	<450-1,000	<450	Other*	Total
1956-57	N	84	19	40	0	7	3	3	156
	%	53.8	12.2	25.6	0	4.5	1.9	1.9	100
1957-58	N	94	27	33	3	2	2	3	164
	%	57.2	16.4	20.1	1.8	1.2	1.2	1.8	100
1958-59	N	104	21	33	0	8	8	1	175
	%	59.4	12.0	18.8	0	4.6	4.6	.6	100
Total	N	282	67	106	3	17	13	7	495
	%	57.0	13.5	21.4	.1	3.4	2.6	1.4	100

*Other includes: non-grads, out of state, no information

$X^2 = 7.08$ n.s.

Table 5.4

Size of the Community in which the High School was Located for Three Junior Classes of Women in the Elementary 1A Program by Academic Year

Year		Urban	Suburban	>20,000	10-20,000	<10,000	Out of State	Total
1956-57	N	81	20	2	4	46	2	155
	%	51.9	12.8	1.3	2.6	29.5	1.3	100
1957-58	N	81	21	6	11	42	2	163
	%	49.7	12.9	3.7	6.7	25.7	1.8	100
1958-59	N	94	23	5	7	45	1	175
	%	54.7	13.1	2.9	4.0	25.7	.1	100
Total	N	256	64	13	22	133	5	493
	%	51.9	12.9	2.6	4.4	26.9	1.0	100

$X^2 = 6.39$ n.s.

Table 5.5

Age at Entrance into the Junior Sequence for Three Junior Classes of Women in the Elementary IA Program by Academic Years

Year		> 26	25	24	23	22	21	20	19	18	Total
1956-57											
	N	5	0	2	2	5	13	89	38	2	156
	%	3.2	0	1.3	1.3	3.2	8.3	57.0	24.4	1.3	100
1957-58											
	N	7	4	2	1	6	17	99	28	0	164
	%	4.3	2.4	1.2	.1	3.7	10.4	60.3	17.1	0	100
1958-59											
	N	8	1	1	2	6	19	116	21	1	175
	%	4.6	.6	.6	1.1	3.4	10.8	66.2	12.0	.6	100
Total											
	N	20	5	5	5	17	49	304	87	3	495
	%										

χ^2 = 11.3 n.s.

square test of these data indicated that the proportion of students who entered the junior sequence in the various age categories remained relatively constant from year to year.

In summary, the data presented in the preceding five tables indicate that the typical woman in the Elementary IA program was a graduate of a large urban public high school, 20 years of age as she entered the junior year. She transferred to the College of Education from another college on the campus of the University just prior to beginning the first professional sequence of courses. Even though there are significant deviations from this pattern, it is helpful to get some general picture of these students in terms of the biographical data considered.

Psychometric Data

A description of the psychometric variables which are being used in the analysis of data in this research report was presented in the previous chapter. Table 5.6 presents the means and standard deviations of the five psychometric variables for each of the three junior classes of Elementary IA women. This table also indicates the results of the "F" test of the significance of the difference between the means of each of the variables presented as obtained by the analysis of variance. Table 5.7 presents a comparison of the variances of each of the psychometric variables and shows the results of Bartlett's test of homogeneity of variances for the three groups. Even though the biographical data suggested that the three groups of Elementary IA juniors came from a very similar background, the psychometric data indicate that the three groups are somewhat different where these variables are concerned. Table 5.6 indicates that all of the variables except the high school rank

Table 5.6

Means and Standard Deviations of the HSR, ACE, MAT, Reading and MTAI for Three Junior Classes of Women in the Elementary IA Program by Academic Year

		1956-57 N=156	1957-58 N=164	1958-59 N=173	"F"
HSR	Means	80.4	77.3	78.4	1.16
	sd	16.2	19.6	18.0	
ACE	Means	58.9	51.3	50.2	4.53*
	sd	28.6	31.3	28.2	
MAT	Means	62.4	59.3	59.2	4.95**
	sd	9.9	11.2	9.4	
Reading	Means	80.8	73.4	72.7	3.29*
	sd	29.1	33.4	27.6	
MTAI	Means	544.3	538.6	533.7	5.67**
	sd	26.6	29.5	27.1	

* significant at .05 level
** significant at .01 level

Table 5.7

Bartlett's Test of Equality of Variances for HSR, ACE, MAT, Reading and MTAI for Three Junior Classes of Women in the Elementary IA Program by Academic Year

	1956-57 N=156	1957-58 N=164	1958-59 N=173	Bartlett's Test Chi Square
HSR	261.1	385.9	322.3	6.41*
ACE	820.8	979.8	795.4	26.91**
MAT	98.2	124.9	89.1	5.46
Reading	847.6	1119.1	759.7	16.98**
MTAI	705.1	871.5	733.3	1.78

* significant at .05 level
** significant at .01 level

Table 5.8

The Intercorrelations Among the HSR, ACE, MAT, Reading, and MTAI Scores for Three Junior Classes of Women Who Entered the Elementary IA Program by Academic Year

			ACE	MAT	Reading	MTAI
HSR	1956-57	N=156	.27**	.40**	.25**	.12
	1957-58	N=164	.38**	.37**	.37**	.10
	1958-59	N=173	.31**	.39**	.31**	.21**
ACE	1956-57			.59**	.63**	.28**
	1957-58			.61**	.73**	.15*
	1958-59			.58**	.53**	.23**
MAT	1956-57				.59**	.18*
	1957-58				.74**	.01
	1958-59				.56**	.23**
Reading	1956-57					.21**
	1957-58					.05
	1958-59					.18**

* significant at .05 level
** significant at .01 level

showed significant differences between the means of the three different classes, and Table 5.7 indicates that three of the five variables showed significant differences in the variances. In general, the 56-57 class scored higher than the other two on all of the five psychometric variables. Small differences are noted between the means for the 57-58 and 58-59 groups on the five variables. The 57-58 class is the most variable of the three classes as shown by the data in Table 5.7. To supplement this general picture given by the means and variances, a study of the distribution of each of the variables was made.

The distribution of high school rank data for the total group indicate that the distribution is negatively skewed. The area between the mean and one standard deviation above the mean included one-half of the cases, whereas the area between the mean and one standard deviation below the mean included less than one-third of the cases. It can be seen that the mean high school rank varies little from class to class with only small changes in the variance. In general, the women in this curriculum achieved very well in their high school class, in the upper 20 percent on the average. The distribution of high school ranks does show, however, that there is considerable variability in this regard.

The ACE scores studied were the percentile scores for each individual determined by comparing each individual's raw scores with the norms for entering college students at the University of Minnesota. The distribution of scores indicates a negatively skewed distribution with 62 percent of the scores falling between the mean and two standard deviations above the mean. Although the 56-57 class mean ACE score was significantly larger than the other two classes, the total group on the average was of about the same scholastic ability as the entering college freshmen at the University who composed the norm group. The variances suggest a wide variability among the scholastic aptitudes of the total group. The direction of the skewness indicated a concentration of high scores with some low scores significantly influencing the central tendency of the distribution.

The analysis of the Miller Analogies Test (MAT) scores used the raw scores. The distribution of these scores, as in the other two psychometric variables, was negatively skewed with the largest proportion of cases concentrating above the mean. Although the 1956-57 junior class had a significantly higher mean than that of the other two years, the actual difference in the score values of the means may be of limited practical significance. The standard deviation of the distribution seems to be stable from year to year.

The analysis of the distribution of Cooperative Reading Test raw scores for the Elementary IA women indicated a nearly symmetrical distribution with only a slight tendency toward negative skewness. As found earlier, the 56-57 class had a significantly higher mean score and the 57-58 class was the most variable.

Scores used in the analysis of the MTAI data were the raw scores with a constant of 500 added to each score. The distribution of MTAI scores showed negative skewness with 61 percent of the cases falling between the mean and two standard deviations above the mean. Mean scores for the three groups were significantly different and showed a decrease with each succeeding class. The variability for the three groups was not significantly different.

In general, it seems that the women in Elementary IA for the three groups studied did considerably better than the average in high school achievement, and they were about average in scholastic aptitude when compared with entering college students. The norms in current use in the College of Education for MTAI scores indicate that the three groups studied scored somewhat below the average of the norm group, falling at about the 40th percentile. It should be remembered in interpreting data for these groups of elementary women that the distribution of all of the variables showed some negative skewness.

In Table 5.8 the intercorrelations among the five psychometric variables are presented for each of the three junior classes of Elementary IA women. In general the table shows that the intercorrelations of ACE, MAT, and Coop Reading scores are of the order of .60. The intercorrelations of high school rank with ACE, MAT, and Reading are of the order of .35. The correlation coefficients obtained when MTAI scores were correlated with the four other psychometric variables indicates that the relationship tends to be about .15. It must be remembered that the size of these correlations is undoubtedly influenced by the fact that the population were entering juniors. Similar intercorrelations for freshmen have shown different results and these differences can be accounted for by the differential selectivity which the first two years of college provide.

In addition to an interest in the general level of the correlations among the psychometric variables, two other questions were asked. First, are the obtained correlations from the separate classes estimates of a relationship which is actually different from zero? Secondly, are there differences between the individual correlation coefficients obtained from the same pair of variables for the three different classes of entering juniors? The answer to these two questions may be determined by computing two extreme examples, one at either end of the distribution of coefficients. To consider the question of whether correlations in the table were larger than could be expected by chance, tests of the hypothesis that Rho equals zero were first made for the three correlations between MAT and MTAI. These correlations, .18, .01 and .23, were the lowest of those found in Table 5.8. The correlations were transformed using Fisher's Z transformation, and when combined, they indicated that the best estimate of the correlation between MTAI and MAT, considering that the three "r's" obtained were estimates of the true correlation, was .145. The hypothesis that Rho equals zero was rejected, indicating that the relationship was larger than could be expected by chance. It would follow that, when one considers each of the three correlations between any set of two variables as a separate estimate of the relationship, all of the relationships were larger than could have been expected by chance. To answer the second question a test of the equality of the "r's" indicated that the correlations between MTAI and MAT for the three groups were not any more variable than could have been expected on the basis of sampling errors. The hypothesis of equality of "r's" was accepted.

A test of the correlations between MAT and Reading scores, the highest relationship reported, was needed to indicate whether or not the correlations were significantly larger than zero, for this may be inferred from the previous test of the smallest "r's". It was necessary to determine whether or not the correlations from the three junior classes were in fact different. A test of the hypothesis that the correlations between MAT and Reading for the three groups were equal was rejected at the one percent level of significance. The results indicated that the correlation for the 57-58 class was significantly larger than that for the other two classes. Because of their similarity to the example computed, it would also follow that the correlation coefficients between ACE and Reading scores were also significantly different, with the 57-58 class showing the highest "r". Five of the six correlations involving HSR, ACE, MAT and Reading scores were higher for the 57-58 group than for the other two classes, but only two, ACE-Reading and MAT-Reading, can be judged to be significantly larger than would be expected from sampling errors. Such differences are affected by the larger HSR, ACE and Reading variances for the 57-58 class. It is also interesting to note that the 57-58 class had lower intercorrelations between MTAI and the other four variables than was true for the 56-57 or 58-59 classes, though these differences were not judged to be significant.

Academic Data

Only one academic variable, transfer grade point average, will be presented in this section which describes the three classes of elementary women as they entered the College of Education. Table 5.9 presents the means and standard deviations of the grade point average earned by those students transferring to the College of Education from some other institution of higher education. Transfer students had, on the average, a 2.5 GPA (A = 4.0) which means that their prior college work average C+. The "F" value in Table 5.9 indicates that the analysis of variance test of the difference between the three means was not significantly larger than would be expected by chance. The hypothesis that there were differences between the classes was rejected. Any interpretation of these data must recognize that transfers from other institutions would not be acceptable if the GPA were less than 2.0.

Table 5.9

Means and Standard Deviations of the Transfer GPA for Three Junior Classes of Women Who Entered the Elementary IA Program by Academic Year

	1956-57	1957-58	1958-59	"F"
Mean	2.45	2.52	2.50	.42
Standard Deviation	.43	.44	.49	

Summary

In this first section of this chapter the three entering junior classes have been described and compared. Five biographical variables were presented which gave a picture of these students' school of prior registration and the number of credits completed before entering the College of Education. A description of the size and type of high school and the high school community was also presented. In addition, a description of the age distribution of the three groups as they entered the junior year was given. The means, variances, and intercorrelations for the five psychometric variables were given as were the academic data which described the prior achievements of the transfer student.

Criterion Groups Described and Compared

This section presents a description and a comparison of data for "persists" and "nonpersists," the two groups which resulted from the application of the criterion of persistence to the classes at the close of spring quarter, 1959. In a previous chapter, this report has discussed the criterion of persistence as it is used in this study. Students who were classified as "persists" were either (1) those who had graduated from the College of Education or (2) those who were enrolled in the College of Education as of spring, 1959. Using this operational definition of persistence, each student who had entered the College of Education during the years studied was classified as either a persist or a nonpersist.

This section will follow the same format as the previous one, and the variables to be discussed will be arranged in the same order. The purpose here will be to compare the persists with the nonpersists on each of the variables. In addition to those discussed above, two grade point average variables and a probation variable will be added which describe some of the important aspects of academic performance.

The reader needs to remember that a comparison of persists and nonpersists for the three years studied does not mean the same for the 1958-59 class as for the other two. Since the classification of persists or nonpersists was made at the end of spring, 1959, the junior class of 58-59 normally would have completed

Table 5.10

A Comparison of School of Prior Registration for Persists and Non-Persists for Each Year of Entry

	High School		Colleges Other Than U. of M.		Colleges of U. of M.		Total	
1956-57	f	%	f	%	f	%	f	%
P	43	31	30	21	68	48	141	100
NP	7	47	3	20	5	33	15	100
Total	50	32	33	21	73	47	156	100
					$X^2 = 1.76$ n.s.			
1957-58	f	%	f	%	f	%	f	%
P	32	24	42	31	60	45	134	100
NP	3	10	16	53	11	37	30	100
Total	35	21	58	36	71	43	164	100
					$X^2 = 5.94$ sig.			
1958-59	f	%	f	%	f	%	f	%
P	40	25	48	30	72	45	160	100
NP	2	15	5	39	6	46	13	100
Total	42	24	53	31	78	45	173	100
					$X^2 = .99$ n.s.			

only one of their two years of upper division work before graduation. The other two junior classes would have completed the degree if they made normal progress.

Biographical Data

Comparisons of the five biographical variables for persists and nonpersists were made in two ways. For each of the three junior classes a separate comparison was made between the persists and nonpersists in that class, using the Chi square test of independence. Second, a multiple Chi square test was made to determine whether or not there was a relationship between persists and nonpersists on the variable considered when the three classes were considered simultaneously. Separate Chi square tests were made to determine whether persistence was related to the year of admission, holding the biographical variable constant, and to compare persistence with the biographical variabls, holding year of admission constant. Though the calculation for these tests and the accompanying data might be represented in at least three different tabular forms, only the table giving the relationship of persistence to the biographical variable year-by-year will be presented here.

Table 5.10 gives the data regarding the school of prior registration. The Chi square values for the 56-57 class and for the 58-59 class indicate that there was no relationship between persistence and the school of prior registration. There was, in other words, no tendency for either the persists or the nonpersists to come from a particular type of school. For the 57-58 group, however, this

Table 5.11

A Comparison of Credits at Entry for Persists
and Non-Persists for Each Year of Entry

	High School		Adv. Fr.		Soph.		Junior		Senior		Total	
1956-57	f	%	f	%	f	%	f	%	f	%	f	%
P	44	31	6	4	33	23	52	37	6	4	141	99
NP	6	40	0	0	5	33	4	27	0	0	15	100
Total	50	32	6	4	38	24	56	36	6	4	156	100
									X^2 = 1.24 n.s.			
1957-58												
P	33	25	3	2	44	33	48	36	6	4	134	100
NP	3	10	0	0	10	33	14	47	3	10	30	100
Total	36	22	3	2	54	33	62	38	9	5	164	100
									X^2 = 3.93 n.s.			
1958-59												
P	40	25	12	7	46	29	62	39	1	1	161	101
NP	2	14	2	14	3	21	6	43	1	7	14	99
Total	42	24	14	8	49	28	68	39	2	1	175	100
									X^2 = 1.01 n.s.			

*Chi square was computed by considering only three credits at entry categories: High School, Advanced standing freshmen plus sophomores, and juniors plus seniors.

relationship is not the same as for the other two classes. The significance is due to the proportionately small number of nonpersists who came from high schools and the proportionately large number of nonpersists who came from colleges other than the University of Minnesota.

The fact that the second class is different from the first and the third is also reflected in the significant Chi square values obtained when the three factors of persistence, year of admission, and school of prior registration are considered together. For the three classes, only 12 percent (58 of 435) were classified as nonpersists, but for those students coming from colleges other than the University of Minnesota in the 57-58 class more than twice as many (16 of 58, 28 percent) were classified as nonpersists. Except for the disproportionate number of nonpersists in the category just described, the description of the students at the time they entered the College of Education was equally true when the persists and nonpersists were considered as separate groups. That is, the proportion of the nonpersists who came from high school was about the same as the proportion of persists, and the proportion of nonpersists from other colleges on the campus of the University of Minnesota was only slightly less than the proportion of the persists.

Table 5.11 presents the relationship between credits which students had earned at the time of their entrance to the College of Education and persistence. The non-significant Chi square values indicate that persistence is independent of the number of credits at entry when the three classes are considered separately. When the credits at entry for the three classes were considered simultaneously against the criterion of persistence, the Chi square was

Table 5.12

A Comparison of Type and Size of High School for Persists and Non-Persists for each Year of Entry.

	Public						Private								
	>2,000		1-2,000		< 1,000		>1,000		450-1,000		<450		Other**		Total
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	
1956-57															
P	77	54	15	11	36	26	0	0	7	5	3	2	3	2	141
NP	7	46	4	27	4	27	0	0	0	0	0	0	0	0	15
Total	84	54	19	12	40	26	0	0	7	4	3	2	3	2	156
											$*\chi^2 = 2.22$ n.s.				
1957-58															
P	80	60	22	16	25	19	3	2	2	1	1	1	1	1	134
NP	14	47	5	17	8	26	0	0	0	0	1	3	2	7	30
Total	94	58	27	16	33	20	3	2	2	1	2	1	3	2	164
											$*\chi^2 = 1.22$ n.s.				
1958-59															
P	98	61	20	12	28	17	0	0	6	4	8	5	1	1	161
NP	6	43	1	7	5	36	0	0	2	14	0	0	0	0	14
Total	104	59	21	12	33	18	0	0	8	5	8	5	1	1	175
											$*\chi^2 = 1.89$ n.s.				

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*Chi Square was computed by considering only three categories of high schools: Large public >2,000, Small public <2,000, and Private.

**Other includes out of state, non grad. and no information.

Table 5.13

A Comparison of the Size of Community in which the High School was Located for Persists and Non-Persists for each Year of Entry.

	Urban		Suburban		$>$20,000		10-20,000		$<$10,000		Other		Total	
	f	%	f	%	f	%	f	%	f	%	f	%		
1956-57														
P	76	94	17	85	1	50	3	75	41	89	2	100	140	90
NP	5	6	3	15	1	50	1	25	5	11	0	0	15	10
Total	81		20		2		4		46		2		155	
											χ^2 = 5.44 n.s.			
1957-58														
P	68	84	18	86	6	100	9	82	32	76	1	50	134	82
NP	13	16	3	14	0	0	2	18	10	24	1	50	29	18
Total	81		21		6		11		42		2		163	
											χ^2 = 1.94 n.s.			
1958-59														
P	87	93	20	87	5	100	7	100	41	91	1	100	161	92
NP	7	7	3	13	0	0	0	0	4	9	0	0	14	8
Total	94		23		5		7		45		1		175	
											χ^2 = 1.88 n.s.			

*Chi Squares were computed by considering four categories: Urban, Suburban, $>$10,000, and $<$10,000.

significant. The significance can be attributed, primarily, to the larger proportion of nonpersists who had entered in 57-58 at the junior or senior level. Some differences can also be noticed among nonpersists who entered at the other levels. *Very little contribution to the significance of the* relationship can be attributed to those who were classified as persists. As was noted in the discussion of the relationship between persistence and the school of prior registration, the differences found in the level at which persists and nonpersists entered can be attributed to the disproportionately large number of students who were admitted from colleges other than the University of Minnesota during the 57-58 year.

The relationship between type and size of high school attended and persistence for women in the Elementary IA program is presented in Table 5.12. As noted in the table, none of the differences between the proportion of persists and nonpersists coming from the various categories of high school were significant for any of the three classes. When the three classes were considered simultaneously the Chi square value was not larger than would have been expected by chance. These results indicate that persistence is independent of the classification of size and type of high school attended and that the description made for the entering classes is adequate for both criterion groups.

In Table 5.13 the relationship between persistence and the size of the community in which the high school was located is presented. None of the Chi square values for the three classes were significant, indicating that persistence and size of the high school community are independent. When the three classes were considered simultaneously, the dimensions studied were still found to be independent. Thus, the size of community in which the

Table 5.14

A Comparison of Age at Entrance into the Junior Sequence for Persists and Non-Persists for each Year of Entry.

	> 26		25		24		23		22		21		20		19		< 18		Total
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	
1956-57																			
P	5	4	0	0	2	1	2	1	5	4	12	8	81	58	32	23	2	1	141
NP	0	0	0	0	0	0	0	0	0	0	1	7	8	53	6	40	0	0	15
Total	5	3	0	0	2	1	2	1	5	3	13	8	89	58	38	25	2	1	156
															*X^2 = 2.52				
1957-58																			
P	5	4	2	2	2	2	0	0	6	4	14	10	83	62	22	16	0	0	134
NP	2	7	2	7	0	0	1	3	0	0	3	10	16	53	6	20	0	0	30
Total	7	4	4	2	2	1	1	1	6	4	17	10	99	61	28	17	0	0	164
															*X^2 = .75				
1958-59																			
P	6	4	0	0	0	0	2	1	4	2	18	11	110	68	20	13	1	1	161
NP	2	14	1	7	1	7	0	0	2	14	1	7	6	44	1	7	0	0	14
Total	8	5	1	1	1	1	2	1	6	3	19	10	116	66	21	12	1	1	175
															*X^2 = 7.46 sig. .05				

*Chi Squares were computed by considering three age categories: > 21, 20, and < 19.

Elementary IA women attended high school seemed to have no relationship to their persistence in teacher eduation.

In testing the relationship between the age at entrance to the junior year and persistence reported in Table 5.14, the large number of age categories were reduced to three: over 20, 20, less than 20. Combining the age categories was necessary in order to meet the assumptions for determining the significance level of the Chi square. The three combined categories can be interpreted as older than the typical age for junior women, the typical age, and younger than the typical age. The table indicates that age and persistence were unrelated for the first two classes, but related for the third. In the case of the third class, 58-59, there was a disproportionately large number of older students who were nonpersists. When the relationships between age, persistence, and class were considered simultaneously, the Chi square value was significantly larger than would have been expected by chance. The significance of the Chi square value came primarily from the relationship of age with nonpersistence in the three classes considered, but the relationship is not consistent from year to year. In the 1956-57 class fewer nonpersists than expected were in the older age group. For the 1957-58 class more nonpersists than expected were in the typical age group. For the 1958-59 class there were fewer nonpersists than expected in both the typical and younger age groups. Even though these data do suggest a relationship between age and nonpersistence, there was no pattern which was constant from year to year.

Reviewing the relationship between the biographical variables and persistence, no consistent pattern is apparent from year to year for the classes studied. Perhaps the most that can be said is that the differences noted were most often due to disproportionalities in the nonpersist group.

Table 5.15

A Comparison of the Means (1) Between the Persists and Non-Persists and (2) Among the Three Classes of Women in the Elementary 1A Program on Five Psychometric Variables.

		1956-57	1957-58	1958-59	"F"
		P=141 NP=15	P=134 NP=30	P=160 NP=13	
HRS	P	81.0	79.4	79.0	.52
	NP	74.6	67.6	71.0	.57
	"t"	1.45	3.05**	1.55	
ACE	P	59.5	53.6	50.0	3.96*
	NP	53.4	40.8	52.6	2.36
	"t"	.78	2.04*	-.25	
MAT	P	62.7	60.6	59.6	3.69*
	NP	59.5	54.6	55.5	1.57
	"t"	1.19	2.74**	1.52	
Reading	P	81.6	75.3	73.3	3.06*
	NP	73.5	66.8	74.3	.45
	"t"	1.02	1.28	-.11	
MTAI	P	543.8	540.1	533.0	6.45**
	NP	548.8	531.6	546.5	1.61
	"t"	-.75	1.56	-1.75	

Psychometric Data

Table 5.15 presents a comparison of the means between the persists and nonpersists for each of the three classes studied on all of the five psychometric variables. Considering each of the junior classes separately, the "t" values indicate that there were no significant differences between the persists and the nonpersists for the 56-57 class on any of the five variables. For the 57-58 class significant differences were found for three of the five variables, HSR, ACE, and MAT, and in all cases the means were higher for the persists than for the nonpersists. In the 58-59 class none of the five psychometric variables were different for the persists than for the nonpersists.

The right hand column of Table 5.15, headed "F", announces the results of comparisons of the three classes for each of the five variables. This column indicates that four of the five psychometric variables showed significant differences among persists in the three classes. No differences were found among the nonpersists. For the high school rank data it can be seen that there are no differences for either the persists or the nonpersists in the three classes. The significant difference between persists and nonpersists for the 57-58 year was noted. It may well be that this difference can be attributed to the fact that there are roughly twice as many nonpersists in this group, giving a better estimate of the mean value and providing more degrees of freedom for the testing of significance. For the three years combined, the persists had a mean high school rank of 80 and the nonpersists had a mean high school rank of 72. Even though this difference does not reach statistical significance,

Table 5.16

A Comparison of the Variances for Persists and Non-Persists of Women in the Elementary 1A Program on Five Psychometric Variables.

		1956-57	1957-58	1958-59
		P=141	P=134	P=160
		NP=15	NP=30	NP=13
HSR	P	254.4	342.4	306.7
	NP	307.8	480.8	492.5
	F	1.21	1.40	1.61
ACE	P	791.5	980.1	820.6
	NP	1137.4	873.9	520.1
	F	1.44	1.12	1.58
MAT	P	92.7	126.6	90.3
	NP	149.6	03.5	63.9
	F	1.61	1.35	1.41
Reading	P	820.3	1236.3	778.3
	NP	1118.4	564.3	575.7
	F	1.36	2.19	1.35
MTAI	P	728.6	772.6	667.9
	NP	497.2	1294.1	1550.1
	F	1.47	1.67	2.32

except for the one year, it does seem to be of practical importance in demonstrating the relationship of high school rank to persistence in these three classes.

For ACE scores, the differences among the persists in the three junior classes were significant. This significance can be attributed to the high mean for the persists in the 56-57 class. The means for the nonpersists indicate that the 57-58 class mean was lowest, though not low enough to cause a significant difference among nonpersists. It was low enough, however, to contribute to the difference between the means for persists and nonpersists for the 57-58 year. Overall, the mean ACE score for persists was 52 and for nonpersists was 52.

The pattern of MAT scores for the three classes for persists and nonpersists follows the same trend as for ACE scores. The means for persists for the three years were significantly different, probably caused by the unusually high mean for the persists in 56-57. The nonpersists showed no differences among the means even though the mean for the 57-58 nonpersists was lowest, contributing to the difference between the persists and nonpersists for that year. The combined estimate of the MAT score for persists over the three years was 60, for the nonpersists it was 56.

Cooperative reading scores showed that the high mean for the 56-57 persists was responsible for significant differences among the years for the persist group. The nonpersist group showed no significant differences.

Table 5.17a

A Comparison of the Intercorrelations of the Psychometric Variables of Women in the Elementary 1A Program, 1956-57 class, Who Were Persists and Non-Persists. (P = 141, NP = 15)

		ACE	MAT	RDG	MTAI
HSR	P	.26**	.37**	.22**	.09
	NP	.29	.56*	.46	.54*
		NS	NS	NS	NS
ACE	P		.56**	.60**	.25**
	NP		.72**	.81**	.70**
			NS	NS	#
MAT	P			.57**	.17*
	NP			.73**	.43
				NS	NS
Reading	P				.18*
	NP				.62*
					NS

*Denotes coefficient significantly larger than zero.
* = .05 level
** = .01 level
#Denotes significant difference between P and NP
# = .05 level

For the MTAI scores, significant differences among the means of the persists for the three years were found. In this case the differences are attributed to the low mean score for the 58-59 class. No differences were found among the nonpersists for the three classes.

Table 5.16 presents the variances for the psychometric variables for the persists and nonpersists in the three classes. Comparisons were made among the variances for the persists and the nonpersists separately for each of the classes. This comparison was made in order to determine the appropriate test of significance of the means made in Table 5.15. Since the test of homogeneity of variances across the years is not essential for the analysis of variance to be a robust test of the difference among means, this test was not made. None of the differences between the variances was significant at the one percent level. Thus it was concluded that variances of the persists were not different from the variances of the nonpersists for any of the five psychometric variables for any of the three years studied.

Tables 5.17a, 5.17b, and 5.17c present the intercorrelations of the psychometric variables for the persists and nonpersists in each of the three classes. Each of the tables presents two different kinds of tests of significance. Each correlation coefficient was tested to see whether or not it was significantly larger than zero. The asterisk (*) is used to indicate the significant difference. In addition, the correlation coefficient for the persists and nonpersists on a given pair of variables was tested for significance. This test was accomplished by making a z transformation of the two coefficients and then testing the difference.

Table 5.17b

A Comparison of the Intercorrelations of HSR, ACE, MAT, Rdg. and MTAI of Women in the Elementary 1A Program, 1957-58 class, Who Were Persists and Non-Persists. (P = 134, NP = 30)

		ACE	MAT	Rdg.	MTAI
HSR	P	.40**	.33**	.35**	.06
	NP	.16	.36*	.55*	.13
		NS	NS	NS	NS
ACE	P		.65**	.77**	.08
	NP		.29	.47**	.24
			#	#	NS
MAT	P			.75**	-.08
	NP			.73**	.35
				NS	NS
Reading	P				-.02
	NP				.36*
					NS

*Denotes coefficient significantly larger than zero.
* = .05 level
** = .01 level
#Denotes significant difference between P and NP.
= .05 level

The sharp (#) indicates a significant difference. It must be remembered that the small sample size of nonpersists in each of the classes makes it necessary to have a much higher correlation coefficient to reach the significance level required. The test of the differences between the correlation coefficients is also affected by this small sample size of the nonpersists.

The data from these three tables indicate that there were no systematic differences in the intercorrelations among these variables for the persists and the nonpersists. Those differences that were noted, for MTAI with ACE for the 56-57 class and for ACE with MAT and ACE with Reading for the 57-58 class can probably be attributed to the large variances for one or both of the variables as reported in Table 5.16. This would seem to indicate that the correlations reported in Table 5.8 for each of the entering classes as a whole adequately represents the correlations for persists and nonpersists.

Academic Data

At the close of the spring quarter, 1959, four different academic variables were computed to give an indication of the quality of work which the students in the study had performed. Three were grade point averages computed on a scale in which an "A" grade was equal to 4.0. The fourth classified each student according to his probationary record. The grade point average was computed for grades earned in the two quarters of the beginning junior

Table 5.17c

A Comparison of the Intercorrelations of HSR, ACE, MAT, Rdg. and MTAI of Women in the Elementary 1A Program, 1958-59 class, Who Were Persists and Non-Persists. (P = 160, NP = 13)

		ACE	MAT	Rdg.	MTAI
HSR	P	.31**	.38**	.32**	.18*
	NP	.44	.40	.29	.50
		NS	NS	NS	NS
ACE	P		.60**	.53**	.21**
	NP		.39	.60*	.40
			NS	NS	NS
MAT	P			.59**	.23**
	NP			.13	.48
				NS	NS
Reading	P				.20*
	NP				.07
					NS

*Denotes coefficient significantly larger than zero.
* = .05 level
** = .01 level

sequence, Education 75A and 75B. This course combines the introduction to the elementary school and the course in educational psychology. Five quarter credits are given upon successful completion of each quarter of the sequence, and the sequence is required for all students majoring in elementary education. Grades in student teaching were also computed for those students who had completed their senior year. Since many of the nonpersist students will not have completed student teaching, or indeed may not have been permitted to take student teaching, no comparison was possible between the persists and nonpersists on student teaching grades. Student teaching grades will be used in subsequent studies in a comparison of graduates who teach or do not teach. The third index of scholastic achievement is the overall grade point average. This index is computed by weighting the credits earned using a 4.0 scale and dividing by the number of credit hours attempted. All courses taken at the University, whether in the College of Science, Literature and the Arts or the College of Education, are included in this computation. The fourth variable classified students according to their probationary history and their status as of spring, 1959.

Table 5.18 presents the comparison of means for Ed 75 GPA and overall GPA for the persists and nonpersists and for the three junior classes. The "F" test indicates that the mean Ed 75 GPA and overall GPA were not different among the three classes for either the persists or the nonpersists. A comparison of the mean Ed 75 GPA for persists and nonpersists indicates that there were significant differences for the 57-58 class and the 58-59 class, but not for the 56-57 class. It would seem that the lack of difference for the 56-57 class was influenced by the persists having a mean lower than the average of the persists for the total three years and the nonpersists having a mean higher than the average of the nonpersists for the three

Table 5.18

A Comparison of the Means of the Academic Variables for Persists and Non-Persists and for the Three Years of Entry.

	1956-57	1957-58	1958-59	"F"
Ed 75 GPA				
P	2.43	2.59	2.53	1.46
NP	2.13	1.82	1.46	1.61
"t"	1.61	5.31**	4.22**	
Overall GPA				
P	2.70	2.70	2.61	2.57
NP	2.41	2.29	2.01	1.96
"t"	2.91**	5.06**	4.44**	

* Sig. at .05 level
** Sig. at .01 level

Table 5.19

A Comparison of the Variances of the Academic Variables for the Persists and Non-Persists and for Year of Entry.

	1956-57	1957-58	1958-59	Barlett's Test
Ed 75 GPA				
P	.53	.47	.72	4.40
NP	1.09	.78	.31	1.38
F	2.06*	1.66	2.32	
Overall GPA				
P	.14	.14	.19	3.74
NP	.19	.27	.51	35.97**
F	1.36	1.93	2.68	

* Sig. at .05 level
** Sig. at .01 level

Table 5.20

A Comparison of the Probationary Status for Persists and Non-Persists by Year of Entry.

	Never on Probation		On Probation At Some Time		Totals	
	f	%	f	%	f	%
1956-57						
P	121	93	20	76.9	141	90.4
NP	9	7	6	23.1	15	9.6
Total	130		26		156	
				X^2 = 4.78*		
1957-58						
P	114	86.4	20	62.5	134	81.7
NP	18	13.6	12	37.5	30	18.3
Total	134		32		164	
				X^2 = 8.34**		
1958-59						
P	124	96.1	37	82.2	161	92.5
NP	5	3.9	8	17.8	13	7.5
Total	129		45		174	
				X^2 = 7.42**		

classes. The overall GPA means were significantly different for the persists than for the nonpersists for each of the three classes.

The academic data as reflected in Ed 75 GPA and overall GPA indicate that the persists are significantly higher in their achievement than are nonpersists. These differences hold both for the first course in teacher education and for all of the college work in general.

Table 5.19 presents the comparison of variances for the academic variables whose means were presented in the foregoing table. The significant differences which were found in the variances show that the variances of the nonpersists were unstable from class to class. This variability might well result from the fact that the nonpersist group was composed of those students who were dropped from the college because of their lack of scholastic achievement as well as those who withdrew from the college voluntarily. Combining these two groups would have the effect of increasing the variances of the grade point averages described.

Further information regarding the academic status of the persists and the nonpersists is presented in Table 5.20. For each of the three junior classes this table indicates the percent of the persists and nonpersists who were never on probation or were on probation one or more quarters. From four percent to fourteen percent of the students classified as nonpersists in the three classes were never on probation. However, of those who were nonpersists, a significantly larger percentage had been on probation than were never on probation. This relationship is shown by the three significant Chi square values for each of the three junior classes, indicating that probationary status was related to persistence. It should be noted that during the 1957-58 academic year the College of Education changed its formula for the calculation of grade point averages. The system that began in 57-58 utilized the 4.0 scale, whereas the 3.0 scale had formerly been used. The table suggests, however, that this change in formulas was not the cause for the increased number of nonpersists in 57-58. The percentage of the nonpersists who were on probation at some time (12 out of 30) was the same as in the previous year, but the number of nonpersists who were never on probation nearly doubled. The influence of the grading practices can be seen in the increase of the total number of students placed on probation. In the 56-57 year 17 percent of the class had been on probation at some time. In the 57-58 class the percentage on probation at some time was 20, but in the 58-59 class this percentage jumped to 26. Figures for the College of Education in general would indicate that the increase in the number of students on probation was much greater for the College as a whole than for the group of elementary students included in this analysis.

Summary

In this section of this chapter the comparison of the criterion groups, persists with nonpersists, has been made for each of the biographical, psychometric, and academic variables. Although there were some isolated exceptions, the persists and the nonpersists show the same pattern of biographical variables. The two criterion groups do not tend to be different in the school of prior registration, the number of credits presented for entrance into teacher education, the size and type of high school attended, the size of the high school community, or their age at entrance into the first professional sequence of courses in teacher education. When the psychometric data were considered, there were some significant differences noted between the persists and nonpersists. The differences were not always consistent for the three classes studied, but the persists were consistently higher, though not always significantly, than the nonpersists on HSR and MAT variables. Thus, in the univariate consideration of psychometric variables some pattern of differences begins to emerge; although it cannot always be designated as statistically signficant. The consideration of the correlations among the psychometric variables produced a pattern of relationships somewhat different than is normally found. The difference arises primarily, it seems, from the fact that the students studied were college juniors and seniors rather than underclassmen for who data of this type are most often reported. The intercorrelations showed significant relationships among the variables, and suggested the relationship was of a size that would make a multivariate analysis profitable. The last section of this chapter reports the analysis of data in which the persists were compared with the nonpersists using all of the variables simultaneously.

Discriminant Analysis of Criterion Groups

Introduction

In the two previous sections of the chapter the students studied were described and compared using three types of variables, considering the variables one at a time or the correlation between two variables. It is the purpose of this section to provide a multivariate description of the criterion groups using all the variables together.

The discriminate function, through a simultaneous consideration of means, variances, and covariances, provides the best linear function of the variables for distinguishing between criterion groups. Mathematically, the problem may be viewed as maximizing the ratio of the "between groups" to the "within groups" variances. After the optimum linear function of the variables has been determined, a test of significance is made to determine whether or not the separation of the two groups is a significant one.

In the research reported here, the problem had two different aspects. They may be phrased in the form of these questions:

1. On the basis of information available at the time of admission, can Elementary IA women be classified as to whether they will persist or not persist in teacher education?

2. Using both the data available at the time of admissions and subsequent performance in the College of Education, can those who persist in teacher education be distinguished from those who do not persist?

These two questions are concerned with description and classification. The problem is essentially one of finding whether or not the three types of variables available can be used to describe effectively the two criterion groups.

The presentation of data in this section follows the sequence in which the data were analyzed to answer the two questions posed. Each of the three entering junior classes was considered separately. First the nine variables available at the time of entrance into the program were analyzed using the discriminant analysis, and then the computations were made with twelve variables, the three academic variables added to the nine. Thus six analyses were performed in all, two for each of the three classes, which for convenience were labeled "at entry" and "at term" to designate that the analyses used data available at the time of entry into the program and at the termination of the study. The analysis of variance table which indicates whether or not the weighting of the variables was successful in making the discrimination is first presented. If the "F" test of the difference between the "between groups" variance as compared with the "within groups" variance is significant, then the linear function of the variables was successful in classifying the students as persists or nonpersists. The analysis of variance table is followed by the intercorrelations among the variables, and finally the standardized discriminant weights, L values, for each of the variables is given. These values indicate the relative value which each variable assumed in arriving at the solution.

1956-57 Class

Criterion groups at entry. In Table 5.21 the "F" test indicates that the linear combination of nine variables was not effective in classifying the students into the criterion groups for the 1956-57 class at entry. The intercorrelations and the discriminative weights are given in Table 5.22 and 5.23, but because the separation of the groups on these variables was not significant these data can be used only for comparison purposes with later analyses.

Table 5.22

Intercorrelations of Variables for Discrimination Between Criterion Groups at Entry for 1956-57 Class.

	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
HSR	.26	.39	.25	.13	-.15	.11	-.16	-.08
ACE		.58	.62	.29	-.07	.04	.10	.12
MAT			.59	.19	-.04	-.07	.15	.14
Reading				.22	.05	-.02	.14	.10
MTAI					-.23	.22	-.12	-.12
Credits at Entry						-.18	.21	.24
Age							-.15	-.12
High School								.82

Table 5.23

Standarized Discriminant Weights (L) for Discrimination Between Criterion Groups at Entry for 1956-57 Class.

	L
Size of City	-.0689
High School	.0465
HSR	.0547
Credits at Entry	.0245
Age	-.0239
MTAI	-.0198
ACE	.0169
Miller	.0070
Reading	.0025

Table 5.25

Additional Intercorrelations of Variables for Discrimination Between Criterion Groups for 1956-57 Class.

	o/All	Ed 75	Prob.
75 GPA	.76		
Prob.	-.35	-.31	
HSR	.46	.38	-.27
ACE	.20	.21	-.10
MAT	.41	.40	-.15
Rdg.	.31	.33	-.14
MTAI	.19	.21	-.07
Entry	.00	-.17	.05
Age	-.06	-.07	-.03
H. S.	-.01	-.11	.02
City	-.03	-.18	.03

Table 5.26

Discriminant Weights for Discrimination (L) Between Criterion Groups at Term for 1956-57 Class.

	L
Probation	-.0915
Size of City	-.0689
o/All GPA	.0671
Ed 75 GPA	-.0500
High School	.0396
MTAI	-.0263
Age	-.0257
ACE	.0242
Credits at Entry	.0155
Reading	-.0042
HSR	-.0017
MAT	.0013

Criterion groups at term. The results of the analysis of variance presented in Table 5.24 indicate that the 1956-57 class persists were effectively distinguished from the nonpersists based on the twelve variables. Table 5.26 indicates why the discrimination was possible with twelve variables when it was not possible with the nine variables. Three of the four highest standardized discriminative weights were probation, overall GPA, and Ed 75 GPA. These are the three variables which were used to provide a description of the quality of academic work for the period between admission and the close of the study.

Table 5.21

Analysis of Variance Test for Discrimination Between Criterion Groups at Entry for 1956-57 Class

Source	df	Sum of Squares	Mean Square	F
Between	9	.000255	.000028296	.954
Within	146	.004334	.000029684	

Table 5.24

Analysis of Variance Test for Discrimination Between Criterion Groups at Term for 1956-57 Class

Source	df	Sum of Squares	Mean Square	F
Between	12	.0028526	.0002377	2.344**
Within	143	.0145054	.0001014	

1957-58 Class

Criterion groups at entry. Table 5.27 indicates that the nine variables available at the time the 1957-58 class entered the junior year could be used effectively to classify the persists and the nonpersists. By comparing the standardized discriminative weights in Table 5.29 with the weights obtained in the analysis of the 56-57 class (Table 5.23) a number of differences can be seen. For the 57-58 class only high school rank remained as one of the three most heavily-weighted variables. The two most effective variables for the 57-58 class were the two least effective for the 56-57 class. Such a comparison must be made cautiously, however, since the 56-57 persists could not effectively be classed from the nonpersists.

Criterion groups at term. Table 5.30 indicates that the classification of persists and nonpersists with the twelve variables was significant at the one percent level. A look at the discriminative weights in Table 5.32 indicates the relative effectiveness of the variables in making the discrimination. As in the analysis for the previous class, two of the top three variables were academic variables which indicated the degree of success in the College of Education. For the 57-58 class, the two variables are probation and Ed 75 GPA, while in the 56-57 class, two of the top three were probation and overall GPA.

Table 5.28

Intercorrelations of Variables for Discrimination Between Criterion Groups at Entry for 1957-58 Class.

	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
HSR	.35	.31	.34	.05	-.10	.19	-.33	-.20
ACE		.58	.72	.09	-.10	.01	.14	-.06
MAT			.74	.01	-.02	-.10	.04	.03
Reading				.03	-.03	-.09	-.06	-.03
MTAI					.00	.11	-.10	-.04
Credits at Entry						-.08	.26	.22
Age							-.36	-.32
High School								.82

Table 5.29

Discriminant Weights for Discrimination Between Criterion Groups at Entry for 1957-58 Class.

Variables	L
MAT	.0621
Reading	-.0472
HSR	.0307
Credits at Entry	-.0258
MTAI	.0206
ACE	.0131
High School	-.0128
Age	.0091
Size of City	-.0032

Table 5.27

Analysis of Variance Test for Discrimination Between Criterion Groups At Entry for 1957-58 Class

Source	df	Sum of Squares	Mean Square	F
Between	9	.000823	.000091432	2.43*
Within	154	.005794	.000037623	

Table 5.30

Analysis of Variance Test for Discrimination Between Criterion Groups at Term for 1957-58 Class

Source	df	Sum of Squares	Mean Square	F
Between	12	.0034901	.0002908	3.68**
Within	151	.0119324	.00007902	

1958-59 Class

Criterion groups at entry. The fact that the nine variables available for this class at the time they entered the College could be successfully combined to discriminate between those who persisted and those who did not is shown in Table 5.33. The F value was significant at the .05 level. Table 5.35 gives the discriminant weights for each of the variables. A comparison of this table with the comparable tables for the other two junior classes shows a lack of consistency in the contribution which these variables make in the discrimination from year to year. Since the discrimination between persists and nonpersists in the 56-57 class was not statistically significant, the discussion is limited to the other two classes. For both of the later classes the MAT was the most heavily weighted variable. In general those variables which came from the junior test battery administered just before the junior year in the College of Education were the most heavily weighted variables. In these analyses the biographical items seemed to be least effective.

Criterion groups at term. The addition of the three academic variables, Ed 75 GPA, Overall GPA, and probation, again increased the F value for the "at term" discriminant analysis over that obtained in the "at entry" analysis. There seems to be little consistency in the discriminant weights for the three classes at term. In general, it can be said that the three academic variables, probation, overall GPA, and Ed 75 GPA, were more heavily weighted for the three classes than were other variables. The two variables relating to high school tended to be low.

Table 5.31

Additional Intercorrelations of Variables for Discrimination Between Criterion Groups at Term for the 1957-58 Class.

	75 GPA	Prob	HSR	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
o/All	.78	-.52	.37	.34	.46	.42	.21	-.06	-.04	-.20	-.07
Ed 75		-.45	.32	.34	.46	.43	.22	-.12	-.03	-.16	-.09
Prob.			-.28	-.16	-.26	-.25	-.06	.14	.01	.11	-.01

Table 5.32

Discriminant Weights for Discrimination Between Criterion Groups at Term for 1957-58 Class.

Variables	L
Reading	-.0642
Probation	-.0517
Ed 75 GPA	.0477
MAT	.0344
ACE	.0235
Size of City	-.0219
Age	.0161
Credits at Entry	-.0160
o/All GPA	.0126
HSR	.0116
High School	.0116
MTAI	.0062

Table 5.34

Intercorrelations of Variables for Discrimination Between Criterion Groups at Entry in the 1958-59 Class.

	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
HSR	.33	.38	.32	.24	-.09	.08	-.02	.27
ACE		.60	.55	.21	.04	.03	.12	.24
MAT			.56	.25	.15	-.06	.16	.22
Reading				.20	.09	-.12	.16	.13
MTAI					-.15	-.01	-.02	.14
Credits at Entry						-.22	.25	.24
Age							-.19	-.11
High School								.69

Table 5.35

Discriminant Weights for Discrimination Between Criterion Groups at Entry for 1958-59 Class.

	L
Miller	.0753
MTAI	-.0575
Age	.0535
ACE	-.0469
High School	-.0250
HSR	.0247
Size of City	.0185
Credits at Entry	-.0176
Reading	-.0055

It will be noted that some of the variables showed an erratic pattern with quite high weights for one class and quite low weights for another.

Table 5.33

Analysis of Variance Test for Discrimination Between Criterion Groups at Entry for 1958-59 Class

Source	df	Sum of Squares	Mean Square	F
Between	9	.0011139	.000123769	2.10*
Within	163	.0096254	.000059051	

Table 5.36

Analysis of Variance Test for Discrimination Between Criterion Groups at Term for 1958-59 Class

Source	df	Sum of Squares	Mean Square	F
Between	12	.0079203	.000660025	4.11**
Within	160	.0256662	.000160414	

Summary

In this section the results of six separate discriminant analyses was presented. Separate computations were made for each of the three junior classes using data available at entry into the junior year and at the time of the close of the study. It may be concluded that the variables studied were effective in discriminating between those who persisted and those who did not. A pattern of the weighting of the variables for the three classes was not consistent, but since the weights are a function of means, variances, and covariances, it is difficult, without further study, to assign specific reasons for the differential effectiveness of certain variables over the three years studied.

Table 5.37

Additional Intercorrelations of Variables for Discrimination Between Criterion Groups at Term for 1958-59 Class.

	75 GPA	Prob	HSR	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
o/All	.75	-.46	.44	.33	.38	.34	.20	.18	-.07	-.10	.02
Ed 75		-.38	.25	.25	.33	.37	.24	.06	-.11	.01	.01
Prob.			-.24	-.22	-.23	-.12	-.18	-.13	-.02	-.04	-.12

Table 5.38

Discriminant Weights for Discrimination Between Criterion Groups at Term for 1958-59 Class.

Variables	L
o/All GPA	.0816
MTAI	-.0812
ACE	-.0644
Age	.0620
Miller	.0582
Ed 75 GPA	.0548
Credits at Entry	-.0502
Size of City	.0433
Probation	-.0422
HSR	-.0228
High School	-.0209
Reading	-.0193

Chapter VI

Women in the English, Language Arts, and Speech Programs

The organization of this chapter is similar to the one used in Chapter 5. Two major differences, however, are noted in a comparison of the two chapters. Because of the smaller number of students in curriculums other than elementary education, some grouping of majors was necessary in order to provide sufficient sample size to make descriptions and comparisons meaningful. This chapter combines those women who were in three curriculums: English, Language Arts, and Speech. Secondly, this chapter differs in that it combines the three junior classes and presents them as one group.

A comparison of the three curriculums combined in this chapter finds a number of similarities. Much of the similarity can be attributed to the relationship of the Language Arts major and the other two. Students in the College of Education who major in Language Arts Education choose to concentrate in either English or in Speech and Theater Arts. The area which is not chosen as the core area automatically becomes the minor field. Those who major in Language Arts, then, have both a major and a minor combined into one total program. The curriculum for those who are English majors or Speech majors has much in common with that for Language Arts majors. The primary distinction in the curriculum for those who are English or Speech majors is in the fact that they may choose any other field as their area of minor concentration. Combined in the three majors studied are those students who are primarily interested in English, primarily interested in Speech and Theater Arts, or those who have interests in both areas even though one may be the predominant interest.

Students in any of the three curriculums enter the College of Education for the junior and senior years after completing at least two successful prerequisite years. Transfer into the College of Education is based on the same procedures as are used for all students seeking admission to the junior year in teacher education. The analyses in this chapter are based on 111 women, 70 majors in English, 21 in Language Arts, and 20 in Speech.

A Description of the Group

Biographical Data

Table 6.1 presents the data regarding the school of prior registration for women in the English, Language Arts, and Speech programs. Since all of the students in these secondary curriculums transfer to the College of Education after completing at least two years of prerequisite work, the headings for this table are slightly different than for the presentation of data regarding elementary students. The school of prior registration is classified either as "on campus" or "off campus." "On campus" indicates that students transferred to the College of Education after completing their prerequisite work in one of the colleges of the University of Minnesota. A typical "on campus" transfer spends two years in the College of Science, Literature, and the Arts, transferring to the College of Education at the beginning of his junior year. It may be, however, that the first college year is spent in an institution other than the University of Minnesota, followed by a transfer to the University and a subsequent transfer to the College of Education. The typical "off campus" transfer student is one who takes his first two years of college work at a junior college, or another four year institution and transfers to the College of Education to complete his degree in teacher education.

The data in Table 6.1 indicate that about three-fourths of the women in the three curriculums transferred from "on campus" and one-fourth from "off campus." The proportions indicate that, even though most of the students in this curriculum received at least one quarter of their work at the University of Minnesota, a sizeable number completed their entire two years at some other institution. For these "off campus" students this inevitably meant that special adjustments were required through advising, counseling, and adjustments in the curricular requirements.

Table 6.1

School of Prior Registration of Women in the English, Language Arts, and Speech Programs

	Off Campus	On Campus	Total
f	26	84	110
%	23.6	76.4	100

Table 6.2

Level of Prior Preparation for Women in English, Speech, and Language Arts Programs

	Sophomore	Junior	Senior	Total
f	6	96	8	110
%	5.5	87.2	7.3	100

Table 6.2 presents the level of prior preparation for the group. These data indicate that seven out of eight of these students entered at the junior level (with 86 to 135 credits). Students may be admitted to the College with as few as 83 or 84 credits, and this table indicates that about five percent of the students had less than 86 credits, the arbitrary distinction used in this study to designate the beginning of the junior year. That seven percent of the students entered with more than 135 credits is noteworthy. The sequence of courses for those students in the College of Education who major in some secondary academic area required, during the period studied, at least five quarters in residence excluding attendance at summer sessions. Unless special exceptions were made, students could not complete the requirements for a teaching education major in any of the three fields studied here in less than five quarters. Thus, for those entering with senior standing, the normal four years required to complete the degree would not be sufficient time

Table 6.3 presents the data regarding the size and type of high school attended by the women studied. Nearly nine out of ten were graduates of public high schools in Minnesota. The largest number of students came either from the large public high school or the small public high school. Table 6.4 gives additional information about the backgrounds of the students in these curriculums. Those who entered from large public high schools were primarily from the urban schools of Minneapolis, St. Paul, and Duluth. Few of the students came from the suburban high schools surrounding the Metropolitan areas. This table also indicates that the largest group came from communities with less than 10,000 population. Together these two tables suggest that women in English, Speech, and Language Arts were almost evenly divided among those who were of urban background and those who came from smaller towns, with only a few students from areas other than these.

Table 6.3

Size and Type of High School Attended by Women in English, Speech, and Language Arts Programs

	Public			Private				
	>2,000	1-2,000	<1,000	>1,000	450-1,000	<450	Others	Total
f	45	14	38	1	2	3	7	110
%	40.9	12.7	34.5	.9	1.8	2.7	6.4	100

Table 6.4

Size of High School Community for Women in English, Speech, and Language Arts Programs

	Urban	Suburban	>20,000	10-20,000	<10,000	Out of State	Total
f	41	6	5	4	48	6	110
%	37.3	5.5	4.5	3.6	43.6	5.5	100

Table 6.5 presents the data relative to the age at entrance to the junior year for the groups. Nearly seventy percent were at age twenty with the remainder of the group almost equally split between those who were older than twenty and those who were younger. It is significant to note that about five percent of the group were twenty-six years of age or older. The distribution of ages suggests that there were some significant deviations from the pattern of ages which is typical of junior students in college.

Table 6.5

Age of Entrance to Junior Year for Women in English, Speech and Language Arts Programs

	>26	25	24	23	22	21	20	19	Total
f	5	0	2	2	4	7	76	14	110
%	4.5	0	1.8	1.8	3.6	6.4	69.1	12.7	100

Psychometric Data

Table 6.6 presents the means and standard deviations of the five psychometric variables. Since a comparison of students in these curriculums with those in the other curriculums studied is presented later, the presentation here is confined to a description of those in the English, Speech, and Language Arts curriculums. The data show that the mean high school rank for the group was 89, indicating that, on the average, the women in the sample were in the upper one-tenth of their high school classes. The mean ACE percentile for the group indicated that they were, on the average, in the upper one-fourth of the norm group on this measure of scholastic aptitude. The MAT, a test of scholastic aptitude given at the beginning of the junior year, indicated that women in this curriculum were slightly above average when compared to the norms for all College of Education juniors. The mean reading score, also taken at the junior year, indicates that these students read as effectively as Education juniors in general or perhaps a bit above. The mean MTAI score indicates that the attitudes measured by this instrument for this group of women were in the lower one-fifth of the general norm group for all Education juniors.

Table 6.6

Means and Standard Deviations of the Five Psychometric Variables

	HSR	ACE	MAT	RDG	MTAI
Means	88.6	75.4	68.6	108.1	537.3
Standard Deviations	11.28	27.11	10.41	30.92	28.01

Academic Data

Table 6.7 indicates what proportion of the sample had been on academic probation at some time. The table shows that fewer than one in twelve were ever so designated.

Table 6.7

Classification of Women in English, Speech, and Language Arts by Academic Probation

	On Probation At Some Time	Never on Probation	Total
f	8	103	111
%	7.2	92.8	100

A Comparison of Persists and Nonpersists

Table 6.8 compares the school of prior registration for persists and nonpersists. The table indicates that for the total group slightly over 80 percent of the group were classified as persists. Although a slightly higher percentage of those from off campus institutions were classified as nonpersists than for those who transferred from on campus, this difference was not statistically significant. In general, persistence was not related to the school of prior registration.

Table 6.8

A Comparison of Persists and Nonpersists by School of Prior Registration for Women in English, Speech, and Language Arts

	Off Campus		On Campus		Total	
	f	%	f	%	f	%
P	21	80.8	70	83.3	91	82.7
NP	5	19.2	14	16.7	19	17.3
Total	26	100	84	100	110	100

χ^2 = .09 n.s.

The comparison of persistence with the level of prior preparation is made in Table 6.9. It is interesting to note, even though the relationship was not statistically significant, that a higher percentage of nonpersists were found among those who entered at the senior level as compared to those who entered at the junior year.

Table 6.9

A Comparison of Persists and Nonpersists According to Level of Prior Preparation for Women in English, Speech, and Language Arts

	Junior		Senior		Total	
	f	%	f	%	f	%
P	85	83.3	6	75.0	91	82.7
NP	17	16.7	2	25.0	19	17.3
Total	102	100	8	100	110	100

χ^2 = .35 n.s.

The comparison of persists with nonpersists according to the high school they attended is made in Table 6.10. As an indication of the relationship between size and type of high school and persistence, the Chi square test of independence was made, but the small frequencies in a number of the categories

Table 6.10

A Comparison of Persists and Nonpersists by Size and Type of High School Attended for Women in English, Speech, and Language Arts

	Public						Private									
	>2,000		1-2,000		<1,000		>1,000		450-1,000		<450		Others**		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	40	88.9	12	85.7	30	78.9	0	0	2	100	2	66.7	5	71.4	91	82.7
NP	5	11.1	2	14.3	8	21.1	1	100	0	0	1	33.3	2	28.6	19	17.3
Total	45		14		38		1		2		3		7		110	

*X^2 = 1.94 n.s.

*Chi square was computed using 3 categories: Public > 2,000, Public < 2,000 and Private.

**Others include out of state, non grads, and no information

Table 6.11

A Comparison of Persists and Nonpersists by Size of High School Community for Women in English, Speech, and Language Arts

	Urban		Suburban		> 20,000		10-20,000		<10,000		Out of State		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	35	85.4	5	83.3	3	60.0	3	75.0	41	85.4	4	66.7	91	82.7
NP	6	14.6	1	16.7	2	40.0	1	25.0	7	14.6	2	33.3	19	17.3
Total	41		6		5		4		48		6		110	

*X^2 = 1.71 n.s.

*Chi square was computed by considering four categories: Urban, Suburban, > 10,000 and < 10,000 made it necessary that the seven categories of size and type of high school be combined into three: public, larger than 2,000; public, less than 2,000; and private. The Chi square value, 1.94, was no larger than was expected by chance. It is interesting to note, however, that those who came from public high schools with enrollments of less than 1,000 in the junior and senior high school had twice the percentage of nonpersists as those who came from the large public high schools with enrollments of over 2,000 in the top six grades. The numbers of those who attended private high schools were so small that interpretations should not be made.

In Table 6.11 the data compares persistence with the size of the high school community. The results are similar to that given in the previous table. Those who came from urban communities and from communities less than 10,000 in population had the highest persistence rates. A lower persistence rate was noticed among those from suburban communities, but the lowest proportion of persists attended high school in the larger non-urban cities. The Chi square value, however, suggests that in general no relationship was found between size of community and persistence for the women in English, Speech, and Language Arts.

The relationship between age and persistence is explored in Table 6.12. The observed Chi square value (5.73) does not reach the required level for significance at the .05 level (5.99), but it does suggest that a stronger relationship exists between age and persistence than between persistence and any of the other biographical variables. The Chi square test was computed using three age categories: twenty, over twenty, and under twenty. The proportion of nonpersists in the twenty-year category was about twelve percent, while the proportion of nonpersists in the over-twenty age group was about twenty percent. Those who were younger than twenty constituted thirty-five percent of the nonpersist group. Those who were in the typical age group had a better chance of persisting than those who were either younger or older.

Table 6.12

A Comparison of Persists and Nonpersists by Age at Entrance to the Junior Year for Women in English, Speech, and Language Arts

	>26		25		24		23		22		21		20		19		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	4	80.0	0		1	50.0	2	100	3	75.0	5	71.4	67	88.2	9	64.3	91	82.7
NP	1	20.0	0		1	50.0	0	0	1	25.0	2	28.6	9	11.8	5	35.7	19	17.3
Total	5		0		2		2		4		7		76		14		110	

*X^2 = 5.73 n.s.

*Chi square was computed by considering three categories: >21, 20, and <19.

Psychometric Data

The means and standard deviations of the five psychometric variables for the persists and nonpersists in the three curriculums combined are presented in Tables 6.13 and 6.14. These tables indicate that four of the comparisons showed significant differences between the persists and the nonpersists. When high school rank was considered, the persists were found to have a significantly higher mean and a smaller variance than the nonpersists. The ACE scores were significantly higher for the persists and the variance was smaller though not significantly. The MAT results indicate that, on the average, the persists scored significantly higher than the nonpersists, and the scores for persists showed less variability though not significantly so. There were no significant differences when reading or MTAI scores were considered.

In Table 6.15 the intercorrelations among the psychometric variables are given for persists and nonpersists. The results of two different kinds of statistical tests are indicated in this table. Each of the correlation coefficients was tested to see whether it was larger than was expected by chance, the statistical test Rho equals zero. In addition, the difference between the correlation coefficients for persists and nonpersists was tested for significant differences. Because of the smaller number of nonpersists, a larger "r" was required to announce significance, and the sample size of the nonpersists also affected the comparison of the "r's" for persists and nonpersists. All of the individual correlation coefficients were within the range expected, with one exception. The correlation between the HSR and the ACE for persists was only .17. The usual relationship between these two variables is larger, one which is significantly larger than chance and might be expected to range between .30 and .60. It is not unusual that the correlation of MTAI scores with other psychometric variables should be near zero or as high as .30. None of the differences between the correlation coefficients for persists and nonpersists were significant.

Table 6.15

A Comparison of the Intercorrelations of the Psychometric Variables for Persists and Nonpersists for English, Speech, and Language Arts Majors (P = 91, NP = 19)

		ACE	MAT	Rdg.	MTAI
HSR	P	.17	.29**	.30**	-.12
	NP	.40**	.45**	.60**	-.32**
		n.s.	n.s.	n.s.	n.s.
ACE	P		.44**	.44**	-.12
	NP		.72**	.59**	-.23*
			n.s.	n.s.	n.s.
MAT	P			.46**	.17
	NP			.59**	.14
				n.s.	n.s.
Rdg.	P				.05
	NP				-.36**
					n.s.

*Denotes coefficient significantly larger than zero.

* = .05 level

** = .01 level

Table 6.13

A Comparison of Means of Psychometric Data for Persists and Nonpersists for English, Speech, and Language Arts Majors

	HSR	ACE	MAT	Rdg.	MTAI
P	90.1	78.2	69.6	110.2	536.9
NP	81.2	62.0	63.8	97.7	539.1
t	3.27**	2.43*	2.24*	1.59 n.s.	-.31 n.s.

*Denotes coefficient significantly larger than zero.

Table 6.14

A Comparison of Variances of Psychometric Data for Persists and Nonpersists in English, Speech, and Language Arts

	HSR	ACE	MAT	Rdg.	MTAI
P	87.676	671.278	99.793	931.18	809.441
NP	262.400	864.111	128.472	999.539	700.989
F	1.99**	1.29 n.s.	1.29 n.s.	1.07 n.s.	1.15 n.s.

*Denotes coefficient significantly larger than zero.
* = .05 level
** = .01 level

In general, it can be said that the persists were higher achievers in high school and their scholastic aptitudes were higher as measured in high school and as juniors in college. The pattern of intercorrelations among the psychometric variables does not indicate any consistent differences between the criterion groups.

Academic Data

The comparisons of the means and the variances of the over-all grade point average and Ed 55 grade point average for the persists and nonpersists are presented in Tables 6.16 and 6.17. As might be expected, the over-all GPA for persists was higher than nonpersists. This difference was significant at the .05 level. The large variances in Ed 55 GPA for the persists contributed to the significant differences between the variances for persists and nonpersists. This factor contributed to the inability of the "t" test to demonstrate significant differences on mean Ed 55 GPA, even though the absolute difference was even larger than that for over-all GPA. Since the base number of credits for computing Ed 55 GPA was only 10 credits, it is understandable that these grades might be more variable than those for over-all GPA which were based on as many as 180 credits.

A comparison of the probationary status of English, Speech, and Language Arts majors is presented separately for persists and nonpersists in Table 6.18. The Chi square test indicates that the status of the sample of students with regard to probation, whether they had ever been on probation or not, was independent of persistence. The percent of students who were on probation and did not persist was not significantly different than those who were not on probation and did not persist. This table gives additional meaning to the previous tables which discussed the relationship between mean GPA and persistence. Since those on probation naturally have lower grade point averages than those who are not on probation, a preponderance of probation students in the nonpersists category could have been the reason for the difference between the over-all GPA for persists and nonpersists. This, however, was not the case. Since the proportion of nonpersists was about the same in both of the probation categories, it is unlikely that this group had undue influence on the mean grade point averages.

The conclusion, then, is that even though nonpersists are no more frequently placed on probation than those who persist, they do less well in their academic work as measured by over-all grade point average than do the persists.

Discriminant Analysis of Criterion Groups

In the previous section of this chapter, a comparison of persists with nonpersists was made for each of the variables considered in this study. In this section, a multivariate comparison is made between the criterion groups using the discriminant analysis. Two separate analyses were completed. First, the nine variables which were available for describing students as they entered the junior year in the College of Education were considered together. This, then, would suggest whether there were differences between the criterion groups that could be identified at the time of admission to the program. Secondly, the analysis was performed adding three additional academic variables which described the performance of students in the criterion groups during their time in the College of Education. These were overall GPA, Ed 55 GPA, and

Table 6.16

A Comparison of Mean Overall Grade Point Average and Mean Ed 55 Grade Point Average for Women Majoring in English, Speech, and Language Arts Who Were Persists and Nonpersists

	O/All GPA	Ed 55 GPA
P	2.88	2.84
NP	2.63	2.50
t	2.03	1.64

Table 6.17

A Comparison of the Variances of Overall Grade Point Average and Ed 55 Grade Point Average for Women Majoring in English, Speech, and Language Arts Who Were Persists and Nonpersists

	O/All GPA	Ed 55 GPA
P	.220	.743
NP	.318	.333
F	1.45 n.s.	2.23*

* Sig. at .05 level

Table 6.18

A Comparison of the Probationary Status for Women Majoring in English, Speech, and Language Arts Who Were Persists and Nonpersists

	On Probation		Never on Probation		Total	
	f	%	f	%	f	%
P	6	75.0	85	82.5	91	82.0
NP	2	25.0	18	17.5	20	18.0
Total	8		103		111	

χ^2 = .33 n.s.

probationary status. Thus, in the second analysis all twelve variables were used to see whether or not an effective discrimination could be made between persists and nonpersists.

Criterion Groups at Entry.

The analysis of variance table which indicates whether or not the discriminant analysis has been effective in distinguishing between persists and nonpersists is presented in Table 6.19. The "F" ratio indicates that the weights which were assigned to the nine variables by the analysis did not provide an effective method of classifying persists and nonpersists.

Table 6.19

Analysis of Variance Test of the Discriminant Analysis of Persists and Nonpersists Who Were Women Majoring in English, Speech, and Language Arts Using the Nine Variables Available at Entry.

Source	df	Sum of Squares	Mean Square	F
Between	9	.001415	.000157	1.66 n.s.
Within	100	.009540	.000095	

In Table 6.20 the intercorrelations of the variables are presented, and in Table 6.21 the discriminate weights which were established are given. Since the discrimination was not significant, these two tables have only academic interest.

Criterion Groups at Term

In Table 6.22 the nonsignificant "F" test indicates that the addition of the three academic variables to the nine other variables was not sufficient to effect a discrimination between persists and nonpersists. The additional intercorrelations added by these three variables are given in Table 6.23 and the discriminant weights are given for each variable in Table 6.24.

Table 6.22

Analysis of Variance Test of the Discriminant Analysis of Persists and Nonpersists Who Were Women Majoring in English, Speech, and Language Arts Using the Twelve Variables Available at Term.

Source	df	Sum of Squares	Mean Square	F
Between	12	.001383	.000115	1.19 n.s.
Within	97	.009305	.000096	

Table 6.20

The Intercorrelations of the Nine Entry Variables Used in the Discriminant Analysis of Persists and Nonpersists Who Were Women Majoring in English, Speech, and Language Arts

	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
HSR	.23	.33	.37	-.16	.04	.06	.02	.09
ACE		.49	.47	-.13	-.02	.09	.02	.04
MAT			.49	.16	-.05	-.02	-.14	-.14
Reading				-.12	.06	-.09	.09	.02
MTAI					-.05	.01	-.10	-.11
Credits at Entry						-.16	.09	.06
Age							-.10	-.07
High School								.73

Table 6.21

Standardized Weights from the Discriminant Analysis of Persists and Nonpersists for the Nine Variables Available at Entry for Women Who Were Majoring in English, Speech, and Language Arts

Variables	Weights
HSR	.0709
ACE	.0418
High School	-.0334
Credits at Entry	-.0178
MAT	.0086
Reading	-.0082
Size of City	.0061
MTAI	.0009
Age	.0001

Table 6.23

Additional Intercorrelations of Variables for Discrimination Between Criterion Groups at Term of English, Speech, and Language Arts Majors

	SS GPA	Prob.	HSR	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
o/All	.77	-.48	.51	.35	.38	.46	.04	-.02	.07	-.02	-.02
Ed SS		-.37	.34	.30	.28	.43	.02	.04	.01	-.00	-.06
Prob.			-.25	-.15	-.22	-.32	.02	-.01	.11	-.07	-.06

Table 6.24

Standardized Weights from the Discriminant Analysis of Persists and Nonpersists for the Twelve Variables Available at Exit for Women Who Were Majoring in English, Speech, and Language Arts

Variables	Weights
HSR	-.0766
ACE	.0422
Credits at Entry	-.0198
Ed SS GPA	-.0173
Probation	.0150
Size of City	-.0130
O/All GPA	-.0120
MAT	.0117
Reading	-.0107
High School	-.0058
MTAI	.0047
Age	-.0003

In contrast to the discriminant analysis performed on the persist and nonpersist groups in Elementary Education, the analysis for English, Speech, and Language Arts majors showed a much different pattern of weighting. Even though the discrimination was not significant in the case of the latter majors, a comparison of the weights is informative. For the women in English, Speech, and Language Arts, three of the "at entry" variables carried most of the weight. These were HSR, ACE, and size and type of high school. When the three achievement variables were added, HSR and ACE maintained a high weighting, but size and type of high school was reduced to a very small weighting. For both of these analyses, HSR and ACE carry the heaviest and most significant weights. It is noteworthy that, by comparison, HSR and ACE assumed little importance in the analysis of data for women in Elementary Education. For the Elementary women, ACE assumed some importance, but HSR rarely was weighted very heavily. Thus for these two curriculums for women in teacher education, quite different patterns of variables emerged. This difference will become clearer in the analysis in Chapter 9 where the four curriculums studied are compared.

Summary

In this chapter the data for the women who were in the English, Speech, and Language Arts, were presented and analyzed. A univariate and multivariate comparison was made between those who were designated as persists and those who were nonpersists. Typically, these women transferred to the College of Education from the College of Science, Literature and the Arts on campus of the University. They were most often students who had attended high school in Minneapolis or St. Paul, and on the average they ranked in the upper ten percent of their high school class. When the persists and nonpersists were compared, it was found that the persists, in general, had higher HSR and ACE scores, and they had higher mean scores on the MAT taken at the point of entrance into the College of Education. The other variables available at the time of admission showed no differences between persists and nonpersists. Nine multivariate analyses showed that the variables could not be weighted to distinguish persists from nonpersists. In general, then, it seems that those who did not complete the program or maintain their enrollment in it are very much like those who did complete the program.

Chapter VII

Men in the Social Studies Curriculum

Students in the College of Education who wish to prepare for teaching in the social sciences choose either history, geography, economics, sociology, or political science as a field of major emphasis. In addition to the requirements specified in the core, a balance of preparation is specified in the other social science fields to meet the broad requirements of teaching in the junior and senior high schools. Although the official designation indicates that a student is a major in one of the social sciences, for purposes of this study, all of the individual majors were considered as a part of a social studies curriculum.

For the analyses presented in this chapter, all those men admitted to the College of Education as majors in social studies and who enrolled for the professional sequence in the three years studied were included. In the 1956-57 class there were 34, in the 1957-58 class there were 35, in the 1958-59 class there were 35. Since these numbers were not large enough to enable an analysis to be made of each of the years separately, the three classes were combined. By the spring of 1959, when these data were compiled, students in the first two classes, if they made normal progress, had graduated and those in the 1958-59 class were entering their senior year. To provide some indication of the similarity of the men in these classes, comparisons were made on each of the psychometric variables. Although the number in each class was small, making the estimates of means and variances somewhat unstable, there appeared to be little difference between the three classes. Although the analysis is not presented here, it was the judgment of the investigators that combining the three classes for further analysis did not do an injustice to the data.

The presentation of the data in this chapter follows the outline used in prior chapters. A description of the total group using biographical, psychometric, and academic data is presented in the first section. These data are followed by a comparison of the persists with the nonpersists on each of the three groups of variables. The final section presents the results of the multivariate comparisons between persists and nonpersists.

A Description of the Group

Biographical Data

In Table 7.1 and 7.2 the school of prior registration and the extent of the prior preparation for the men in the social studies program are presented. The first table indicates that over 90 percent of students transferred to the College of Education from another college on the campus of the University of Minnesota. Most of these transferred from the College of Science, Literature, and the Arts. As expected, Table 7.2 indicates that nearly four-fifth of these men came with sufficient college credits to place them at the junior level. Nearly five percent, however, transferred with less than 86 credits which, according to the classification used in this study, placed them as sophomores. It should also be noted that one out of six of the students entered with more than 135 credits, placing them as seniors in terms of credits completed. These data indicate that a sizable proportion of men in social studies entered the curriculum late in their college career.

Table 7.1

School of Prior Registration of Men in Social Studies

	Off Campus	On Campus	Total
f	9	95	104
%	8.7	91.3	100

Table 7.2

Level of Prior Preparation for Men in Social Studies

	Soph.	Jr.	Sr.	Total
f	5	82	17	104
%	4.8	78.8	16.3	100

Data relating to the high school attended and the community in which the high school was located are given in Tables 7.3 and 7.4. Over one-half of the group attended large public high schools. A fifth of the men attended public high schools with enrollments of less than 1,000 in grades seven through twelve, and one out of eight attended public high schools with enrollments between 1,000 and 2,000. Private school graduates constituted only one-eighth of the total group. The additional information supplied by Table 7.4 indicates that these students were predominately from urban backgrounds, for nearly 55 percent of them attended urban high schools. The second largest portion of the group, nearly 30 percent, attended high schools in communities of less than 10,000 population. Only a small percent of the group attended high schools in suburban, city, or high schools in large towns.

Table 7.3

Size and Type of High School Attended by Men in Social Studies

	Public			Private				
	>2,000	1-2,000	<1,000	>1,000	<450-1,000	<450	Others	Total
f	56	14	22	5	2	4	1	104
%	53.8	13.5	21.2	4.8	1.9	3.8	1.0	100

Table 7.4

Size of High School Community for Men in Social Studies

	Urban	Suburban	> 20,000	10-20,000	< 10,000	Out of State	Total
f	57	9	1	5	31	1	104
%	54.8	8.6	1.0	4.8	29.8	1.0	100

In Table 7.5, the distribution of ages for the group as they entered the junior sequence is presented. This table indicates that the social studies majors were a diverse age group, for only slightly more than a third of the group were at the typical age of twenty years. One-fourth of the group were twenty-one to twenty-three, and a third of the group were older than twenty-three. This underscores an earlier statement indicating that students in this group of social studies majors decided to enter teacher education at a later time than would be typical of college students in general.

Table 7.5

Age at Entrance to Junior Year for Men in Social Studies

	> 26	25	24	23	22	21	20	19	Total
f	12	8	15	11	7	11	38	2	104
%	11.5	7.7	14.5	10.6	6.7	10.6	36.5	1.9	100

Psychometric Data

The means and standard deviations of the five psychometric variables for social studies men in the three classes are presented in Table 7.6. The HSR variable indicates that, on the average, the social studies majors were in the upper thirty percent of their high school classes. The standard deviation of twenty-three indicates a wide range of variability in the group. The average ACE score for the group was 56. As in the case of HSR, ACE data are percentile ranks, and indicate that the men studied were comparable to the norm group of high school students who entered college as freshmen. The standard deviation indicates a wide range of variability in ACE percentiles. The MAT is a measure of scholastic aptitude administered at the beginning of the junior year. The mean raw score of 65 for social studies men is comparable to the average for all Education juniors. The mean reading score of 97 also falls at the average for all Education juniors. The mean MTAI score for the social studies majors corresponds approximately to the fifteenth percentile for all College of Education juniors. The social studies majors in the three classes studied were very much like College of Education juniors in general, as far a measures of scholastic aptitude and reading comprehension were concerned. They did, however, differ considerably from College of Education students in general when the MTAI was considered. Further comparisons of social studies majors with the other groups analyzed as part of this study are presented in Chapter 9.

Table 7.6

Means and Standard Deviations of the Five Psychometric Variables for Men in Social Studies.

	HSR	ACE	MAT	Rdg.	MTAI
Means	69.4	55.9	65.1	96.7	526.0
Standard Deviations	22.97	30.98	9.76	29.66	26.91

Table 7.7 classifies social studies majors according to their probationary history. The table indicates that five out of six of the students were never on probation during their enrollment in college.

Table 7.7

Classification of Men in Social Studies by Academic Probation

	On Probation At Some Time	Never On Probation	Total
f	16	88	104
%	15.4	84.6	100

A Comparison of Persists and Nonpersists

Biographical Data

In Tables 7.8 and 7.9, persists and nonpersists in the social studies curriculum are compared in terms of their school of prior registration and the level at which they entered the College of Education. These tables indicate that the ratio of persists to the total group was about 3 to 4, indicating that one out of four of the social studies majors did not persist. Even though the ratio was somewhat higher for those who transferred from colleges outside the University than for those who transferred from within the University, the difference was not significant. Table 7.9 indicates that the percentage of nonpersists was higher among those entering at the senior level than for those entering at the junior level. The difference between persists and nonpersists was not great enough to reach the .05 level of significance.

Table 7.8

A Comparison of Persists and Nonpersists by School of Prior Registration for Men in Social Studies.

	Off Campus		On Campus		Total	
	f	%	f	%	f	%
P	6	66.7	73	76.8	79	76.0
NP	3	33.3	22	23.2	25	24.0
Total	9	100.0	95	100.0	104	100.0

X^2 = .42 n.s.

Table 7.9

A Comparison of Persists and Nonpersists According to Level of Prior Preparation for Men in Social Studies.

	Junior		Senior		Total	
	f	%	f	%	f	%
P	68	78.2	11	64.7	79	76.0
NP	19	21.8	6	35.3	25	24.0
Total	87	100.0	17	100.0	104	100.0

X^2 = 1.38 n.s.

In Table 7.10 and 7.11 the high school and community backgrounds for the persists and nonpersists in social studies were compared. In neither of these comparisons was there a significant difference between the size and type of high school attended nor size of community in which the high school was located. The percent of nonpersists from large public high schools, however, was two and a half times greater than that for those from small public schools. Although less dramatic, the same difference exists when the sizes of the high school community were compared. Those who attended high schools in communities of less than 10,000 were more likely to persist than those from the urban communities.

Table 7.10

A Comparison of Persists and Nonpersists by Size and Type of High School Attended for Men in Social Studies.

	Public						Private									
	> 2,000		1-2,000		< 1,000		> 1,000		450-1,000		< 450		Others**		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	38	67.9	13	92.9	19	86.4	5	100	1	50	2	50	1	100	79	76.0
NP	18	32.1	1	7.1	3	13.6	0	0	1	50	2	50	0	0	25	24.0
Total	56	100.0	14	100.0	22	100.0	5	100.0	2	100	4	100	1	100	104	100

$\chi^2 = 5.27$ n.s.

**Others include out of state, non grads and no information
*Chi square was computed using three categories: Public >2,000, Public <2,000 and Private.

Table 7.11

A Comparison of Persists and Nonpersists by Size of High School Community for Men in Social Studies.

	Urban		Suburban		>20,000		10-20,000		<10,000		Out of State		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	41	71.9	7	77.8	0	0	4	80	26	83.9	1	100	79	76.0
NP	16	28.1	2	22.2	1	100	1	20	5	16.1	0	0	25	24.0
Total	57	100.0	9	100.0	1	100	5	100	31	100.0	1	100	104	100.0

*$\chi^2 = 1.82$ n.s.

*Chi square was computed by considering four categories: Urban, Suburban, >10,000, and <10,000.

The distribution of ages for the persists and nonpersists is given in Table 7.12. The Chi square value of 1.06 indicates that age is independent of persistence for those men in the social studies curriculum. Since the numbers in the various age categories were relatively small, it is difficult to interpret the percentage values in each of the age groups with any degree of confidence.

Table 7.12

A Comparison of Persists and Nonpersists by Age at Entrance to the Junior Year for Men in Social Studies

	>26		25		24		23		22		21		20		<19		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	8	66.7	6	75	12	80	8	72.7	4	57.1	9	81.8	30	78.9	2	100	79	76
NP	4	33.3	2	25	3	20	3	27.3	3	42.9	2	18.2	8	21.1	0	0	25	24
Total	12	100.0	8	100	15	100	11	100.0	7	100.0	11	100.0	38	100.0	2	100.0	104	100

*χ^2 = 1.06 n.s.

*Chi square was computed by considering three categories: >21, 20, and <19.

Psychometric Data

A comparison of the means and variances for the persists and nonpersists is presented in Tables 7.13 and 7.14. Since not one of the ten tests of significance was larger than could have been expected by chance, the only conclusion is that persists and nonpersists came from the same population when scores on these five psychometric tests were the variables considered.

Table 7.13

A Comparison of Means of Psychometric Data for Persists and Nonpersists for Social Studies Majors

	HSR	ACE	MAT	Rdg.	MTAI
P	67.9	53.6	64.5	92.3	524.8
NP	73.8	63.0	67.2	110.7	529.6
t	-1.11 n.s.	-1.34 n.s.	-1.36 n.s.	-2.79*	-1.34 n.s.

*Denotes coefficient significantly larger than zero.
* = .05 level

Table 7.14

A Comparison of Variances of Psychometric Data for Persists and Nonpersists in Social Studies

	HSR	ACE	MAT	Rdg.	MTAI
P	539.999	769.646	103.306	847.676	848.049
NP	410.612	793.518	90.029	1363.088	712.023
F	1.32 n.s.	1.03 n.s.	1.15 n.s.	1.61 n.s.	1.19 n.s.

In Table 7.15 the intercorrelations among the five psychometric variables are presented for persists and nonpersists. As in the previous chapters, the individual correlation coefficients were tested to see whether they were larger than zero. In addition, each of the pairs of intercorrelations for persists and nonpersists were compared to see if they were significantly different. None of the comparisons of intercorrelations were significantly larger than could have been expected by chance. Based on other similar studies, only the correlations of HSR and MAT and HSR with reading seemed different than might have been expected. Normally, these correlations would have been significantly larger than chance, but for the persists HSR was not significantly related to MAT or Reading scores.

Table 7.15

A Comparison of the Intercorrelations of the Psychometric Variables for Persists and Nonpersists for Social Studies Majors (P = 79, NP = 25)

		ACE	MAT	Rdg.	MTAI
HSR	P	.29**	.14	-.05	.02
	NP	.33**	.34**	.20*	-.27**
		n.s.	n.s.	n.s.	n.s.
ACE	P		.62**	.51**	.31**
	NP		.55**	.67**	-.12
			n.s.	n.s.	n.s.
MAT]	P			.60**	.24*
	NP			.54**	.37**
				n.s.	n.s.
Rdg.	P				.26**
	NP				-.05
					n.s.

*Denotes coefficient significantly larger than zero.
* = .05 level
** = .01 level

Academic Data

A comparison of the persists and the nonpersists in social studies on the two academic variables is made in Tables 7.16 and 7.17. Table 7.16 indicates that there was a significant difference between persists and nonpersists on both over-all GPA and Ed 55 GPA. Persists earned better than a C+ average in their total grades at the University of Minnesota, and did equally as well when the ten credits of Ed 55 were considered. Nonpersists had slightly above a C average over-all, and less than a C average in Ed 55. No significant differences were noted in the variances of these two grade point averages.

Table 7.18 compares the probationary status of persists and nonpersists. The Chi square value indicates that probationary status is independent of persistence. Persists were found equally as often among those who had been on probation as those who had never been on probation.

Discriminant Analysis of Criterion Groups

The analysis in this section follows the pattern established in previous chapters. Using the discriminant analysis, an optimum weight was established for each variable which would maximize the ratio of the "between criterion groups" variance to the "within criterion groups" variance. This analysis was performed using the nine variables available at the time of entry into the College of Education, and using the twelve variables available at the close of the study.

Criterion Groups at Entry

The effectiveness of the discrimination between the criterion groups is indicated by the result of the "F" test presented in Table 7.19. The value obtained, 1.96, failed to reach the value of 1.97 required to establish significance at the .05 level. These results do indicate that the nine at-entry variables were somewhat effective in separating persists from nonpersists. The intercorrelations among the variables are presented in Table 7.20. In Table 7.21 the discriminant weights for the nine variables are given, indicating that reading scores and age were the most heavily weighted with HSR and size of high school community showing slightly less weight. When compared with the results of the similar analysis of English, Speech, and Language Arts majors in Table 6.21, considerable difference is evident. Of the nine variables considered, only HSR was found among the most heavily weighted variables in both groups. In Chapter 5 the discriminant analysis for the three classes of women in Elementary Education found that HSR was also among those most heavily weighted for two of the three classes.

Table 7.16

A Comparison of Mean Overall Grade Point Average and Mean Ed 55 Grade Point Average for Men Majoring in Social Studies Who Were Persists and Nonpersists

	O/All GPA	Ed 55 GPA
P	2.72	2.62
NP	2.18	1.83
t	4.25**	3.99**

*Denotes coefficient significantly larger than zero
** = .01 level

Table 7.17

A Comparison of the Variances of Overall Grade Point Average and Ed 55 Grade Point Average for Men Majoring in Social Studies Who Were Persists and Nonpersists

	O/All GPA	Ed 55 GPA
P	.255	.614
NP	.202	.527
t	1.26 n.s.	1.17 n.s.

Table 7.18

A Comparison of the Probationary Status for Men Majoring in Social Studies Who Were Persists and Nonpersists

	On Probation		Never on Probation		Total	
	f	%	*f*	%	*f*	%
P	12	75.0	67	76.1	79	76.0
NP	4	25.0	21	23.9	25	24.0
Total	16	100.0	88	100.0	104	100.0

X^2 = .01 n.s.

Table 7.19

Analysis of Variance Test of the Discriminant Analysis of Persists and Non-Persists Who Were Men Majoring in Social Studies Using the Nine Variables Available at Entry

Source	df	Sum of Squares	Mean Squares	F
Between	9	.001861	.000206	1.96
Within	94	.009906	.000105	

Table 7.20

The Intercorrelations of the Nine Entry Variables Used in the Discriminant Analysis of Persists and Nonpersists Who Were Men Majoring in Social Studies

	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
HSR	.30	.19	.01	-.03	-.20	.37	-.10	.09
ACE		.50	.55	.18	.09	.20	.04	.07
MAT			.58	.27	.17	-.17	.06	.15
Reading				.16	.26	-.21	.05	.14
MTAI					.03	-.09	.10	.02
Credits at Entry						-.34	-.20	-.16
Age							-.09	-.08
High School								.77

Table 7.21

Standardized Weights from the Discriminant Analysis of Persists and Nonpersists for the Nine Variables Available at Entry for Men Who Were Majoring in Social Studies

Variables	Weights
Reading	-.0740
Age	.0645
HSR	-.0499
Size of City	.0461
MAT	.0315
Credits at Entry	.0303
MTAI	-.0235
ACE	-.0080
HS	.0042

Criterion Groups at Exit

The "F" value indicated in Table 7.22 gives the results of the discriminant analysis for the social studies criterion groups using twelve variables. The value does not reach the level required to announce significance at the .05 level. The observed "F" value, 1.79, was less than that found when the nine variables were considered. Thus, the discrimination between the criterion groups was less effective when the twelve variables were used than when the nine variables were used. That the three additional academic variables added nothing to the discrimination among persists and nonpersists is indicated by the discriminate weights presented in Table 7.24. The three most heavily weighted variables were the same three which were most effective when only admissions data were considered. Thus the three academic variables had the effect of diluting the discrimination rather than making it more distinct.

Table 7.22

Analysis of Variance Test of the Discriminant Analysis of Persists and Non-Persists Who Were Men Majoring in Social Studies Using the Twelve Variables Available at Term

Source	*df*	Sum of Squares	Mean Square	*F*
Between	12	.002925	.000243	1.79 n.s.
Within	91	.012410	.000136	

Table 7.23

Additional Intercorrelations of Variables for Discrimination Between Criterion Groups at Term

	SS GPA	Prob.	HSR	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
O/All	.62	-.17	.15	.35	.27	.29	.13	.16	-.02	-.02	.01
Ed SS		-.20	.13	.33	.33	.20	.20	.12	-.06	.06	.11
Prob.			-.26	-.14	-.09	.01	.00	.00	-.17	-.05	-.15

Table 7.24

Standardized Weights from the Discriminant Analysis of Persists and Nonpersists for the Twelve Variables Available at Term for Men Who Were Majoring in Social Studies

Variables	Weights
Reading	-.0718
Age	.0695
HSR	-.0537
Ed SS GPA	.0443
Size of City	.0406
MTAI	-.0305
MAT	.0255
Credits at Entry	.0253
ACE	-.0239
Q/All GPA	.0177
H.S.	.0072
Probation	.0040

Summary

This chapter has presented the results of the analyses for men who majored in social studies. Since the three classes were not large enough for separate analyses, they were combined after a gross check of the differences between the groups indicated that the pooling would be permissable.

The typical man in the social studies program entered the College of Education at the junior level from another college on the University of Minnesota campus, usually the College of Science, Literature, and the Arts. A significant number of these students transferred in with enough credits to place them at the senior level. Social studies men most commonly attended large public high schools located in urban communities. A significant number attended small high schools located in smaller communities. Although the typical age for junior men majoring in social studies was twenty, a wide range of ages of these majors was noted.

The psychometric data indicated that social studies men were, on the average, in the upper one third of their high school class. Scholastic aptitude tests showed that they were average when compared with juniors in the College of Education. They were, however, considerably lower as measured by the MTAI.

When the variables were considered singly very little difference was found between those who persisted and those who did not. Of all the academic, psychometric, and biographical variables considered, only the two grade point average variables showed any significant difference between the criterion groups. When the variables were considered simultaneously the multivariate analysis showed results which approached significance when the problem was to discriminate between persists and nonpersists at the time of admission. The discrimination was less effective when the three academic variables were added to the nine available at admission.

Chapter VIII

Men in the Mathematics and Science Curriculums

Data presented for analysis in this chapter are a composite of men in three College of Education curriculums for the three years studied. The combination of majors in mathematics, natural science, and physical science was made after examining the data for the three majors separately. None of the three contained sufficient numbers so that an analysis could be made for each one separately. Over the three year period there were 69 men who entered mathematics, 47 entered natural science, and 13 entered the physical science curriculum. Those who were categorized as nonpersisters at the close of spring quarter, 1959, in each of the three majors were 9, 8, and 1 respectively. An examination of the nine variables available at the time of admission to the College of Education showed no clear-cut pattern of differences between the three majors. The natural science majors, who may choose to concentrate in either biological or physical sciences, tended to be somewhat lower than the other two on HSR and ACE scores. Physical science majors, who concentrate in one of the physical sciences with a required minor in mathematics, showed scores which were somewhat higher on nearly all of the variables. It may be that the small number of students in this sample have affected these comparisons; although a more feasible explanation is that the requirements of this curriculum are such that those who enter are, indeed, a select group. Overall, the magnitude of differences among these curriculums were not judged to be so large that the individual major fields would completely lose their identity by being a part of a math-science combination.

A Description of the Group

Biographical Data

Men in the math and science programs, with few exceptions, transferred to the College of Education from some other college of the University of Minnesota. Only 9 students of the 129 in the group came from another college or university, as is shown in Table 8.1. Since the three curriculums each prescribe two years of prerequisite study, the normal pattern for these students was to enter the College of Education during the junior year. Table 8.2 suggests that only one out of six students transferred with less than 86 credits or more than 135 credits. Most of those who transferred at some time other than the junior year had earned more than 135 credits. This means that the 20 students who had enough credits to be seniors made their decision to enter one of these three teacher education curriculums late in their college career.

Table 8.1

School of Prior Registration of Men in Math and the Sciences

	Off Campus	On Campus	Total
f	9	120	129
%	7.0	93.0	100

Table 8.2

Level of Prior Preparation of Men in Math and the Sciences

	Soph.	Jr.	Sr.	Total
f	3	106	20	129
%	2.3	82.2	15.5	100

Tables 8.3 and 8.4 show the size and type of high school and the size of the high school community from which students in these three majors came. Two out of every five students came from large public high schools, and one out of three came from small public high schools. Less than one student in ten came from a private high school. Table 8.4 shows that an equal number of these men came from urban backgrounds and from communities of less than 10,000 population; together, these two groups compose nearly 90 percent of the men in the three curriculums.

Table 8.3

Size and Type of High School Attended for Men in Math and the Sciences

	Public			Private				
	>2,000	1-2,000	<1,000	>1,000	<450-1,000	<450	Others	Total
f	56	20	43	6	1	1	2	129
%	43.4	15.5	33.3	4.7	.8	.8	1.6	100

Table 8.4

Size of High School Community for Men in Math and the Sciences

	Urban	Suburban	>20,000	10-20,000	<10,000	Out of State	Total
f	56	5	2	8	56	2	129
%	43.4	3.9	1.5	6.2	43.4	1.6	100

The distribution of ages for the men in the three curriculums at the time they took their first professional course in teacher education is given in Table 8.5. Although most of the group, 38 percent, were twenty years of age, the majority of the class was older or younger than the typical college junior. The table shows a fairly even distribution over the various age categories. Nearly 40 percent of the group were 23 years or over.

Table 8.5

Age at Entrance to Junior Year for Men in Math and the Sciences

	>26	25	24	23	22	21	20	19	Total
f	13	13	11	14	7	19	49	3	129
%	10.1	10.1	8.5	10.9	5.4	14.7	38.0	2.3	100

Psychometric Data

In Table 8.6 the means and standard deviations of the five psychometric variables for the men in the math-science curriculums are presented. Academically, these men were in the upper one-fourth of their high school class, and they were in the upper one-third of the distribution of ACE scores for those high school students who went to college. The MAT scores for the group were slightly above the average for all College of Education juniors. The means reading score was somewhat below the average for all juniors. The mean MTAI score for the group was in the lowest decile of the College of Education junior norm group. Comparisons of these statistics with those of the other curriculums will be presented in Chapter 9.

Table 8.7 indicates that 27 percent of the group were on probation at some time during the period considered. As will be noted in a subsequent comparison of students in the various curriculums, the proportion of math and science men on probation was high.

Table 8.6

Means and Standard Deviations of the Five Psychometric Variables

	HSR	ACE	MAT	Rdg.	MTAI
Means	74.5	65.3	67.9	87.0	517.4
Standard Deviations	22.86	27.72	10.05	30.30	28.74

Table 8.7

Classification of Men in Math and the Sciences by Academic Probation

	On Probation At Some Time	Never on Probation	Total
f	35	94	129
%	27.1	72.9	100

A Comparison of Persists and Nonpersists

Biographical Data

The comparisons made in Tables 8.8 and 8.9 indicate that there was no relationship between either the school of prior registration or the level of prior preparation and persistence for the men in math and science curriculums. The proportion of the group who persisted, 86 percent, was approximately the same for those who came from on-campus or off-campus, and for those who entered at the junior or the senior level.

Table 8.8

A Comparison of Persists and Nonpersists by School of Prior Registration for Men in Math and the Sciences

	Off Campus		On Campus		Total	
	f	%	f	%	f	%
P	7	77.8	104	86.7	111	86.0
NP	2	22.2	16	13.3	18	14.0
Total	9		120		129	

$\chi^2 = .47$ n.s.

Table 8.9

A Comparison of Persists and Nonpersists According to Level of Prior Preparation for Men in Mathematics and Science

	Junior		Senior		Total	
	f	%	f	%	f	%
P	94	86.2	17	85.0	111	86.0
NP	15	13.8	3	15.0	18	14.0
Total	109		20		129	

X^2 = .01 n.s.

The comparison of high school and community backgrounds for persists and nonpersists in Tables 8.10 and 8.11 indicates that no relationship was found between either of these variables and persistence. Even though the overall relationship was not significant, it is interesting to note that those who were graduates of small high schools in smaller communities were more likely to persist than those from large high schools in urban or suburban communities.

In Table 8.12 the comparison of persists and nonpersists by age at entrance to the junior year is presented. The Chi square test indicates that age and persistence were independent when three age categories were used; over 20, 20, and under 20. Although the numbers in some of the age categories were small, and likely to be unstable, the highest persistence rates were found in the older age groups. Those who were 21, 20, and 19 showed a lower rate of persistence than those in the older age categories.

Table 8.10

A Comparison of Persists and Nonpersists by Size and Type of High School Attended for Men in Math and Science

	Public						Private						Others**		Total	
	>2,000		1-2,000		<1,000		>1,000		450-1,000		<450					
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	47	83.9	18	90.0	38	88.4	4	66.7	1	100	1	100	2	100	111	86.0
NP	9	16.1	2	10.0	5	11.6	2	33.3	0	0	0	0	0	0	18	14.0
Total	56		20		43		6		1		1		2		129	

*X^2 = 1.52 n.s.

*Chi square was computed using three categories: Public> 2,000, Public< 2,000, and Private.

**Others include out of state, non grads, and no information.

Table 8.11

A Comparison of Persists and Nonpersists by Size of High School Community for Men in Math and Science

	Urban		Suburban		> 20,000		10-20,000		< 10,000		Out of State		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	47	83.9	4	80.0	2	100	6	75.0	50	89.3	2	100	111	86.0
NP	9	16.1	1	20.0	0	0	2	25.0	6	10.7	0	0	18	14.0
Total	56		5		2		8		56		2		129	

$*X^2 = 1.17$ n.s.

*Chi square was computed by considering four categories: Urban, Suburban, > 10,000, and < 10,000.

Table 8.12

A Comparison of Persists and Nonpersists by Age at Entrance to the Junior Year for Men in Mathematics and Science

	> 26		25		24		23		22		21		20		19		Total	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
P	11	84.6	13	100	10	90.9	13	92.9	7	100	15	78.9	40	81.6	2	66.7	111	86.0
NP	2	15.4	0	0	1	9.1	1	7.1	0	0	4	21.1	9	18.4	1	33.3	18	14.0
Total	13		13		11		14		7		19		49		3		129	

$*X^2 = 2.65$ n.s.

*Chi square was computed by considering three categories: > 21, 20, and < 19.

Psychometric Data

A comparison of the persists and nonpersists on the five psychometric variables is presented in Tables 8.13 and 8.14. Consideration of the means for persists and nonpersists indicated that only one of the comparisons resulted in a difference significantly larger than chance expectations. This difference indicated that the mean reading schores for nonpersists was significantly higher than that for persists. Though none of the other differences was significant, it is noteworthy that all of the mean values for nonpersists were higher than those for the persists. Table 8.14 indicates that the variance in MAT, reading, and MTAI scores was larger for nonpersists than for persists, but none of the differences was larger than could have been expected by chance. This analysis of the five psychometric variables indicated that the scores of the nonpersists were higher, though not significantly, on all five variables. On three of the five measures the nonpersists were more variable in their scores than were the persists.

Table 8.13

A Comparison of Means of Psychometric Data for Persists and Nonpersists for Math-Science Majors

	HSR	ACE	MAT	Rdg.	MTAI
P	73.7	65.8	68.1	88.1	516.7
NP	79.5	62.1	66.5	79.8	521.5
t	-1.00 n.s.	.53 n.s.	.65 n.s.	1.08 n.s.	-.66 n.s.

Table 8.14

A Comparison of Variances of Psychometric Data for Persists and Nonpersists in Mathematics and Science

	HSR	ACE	MAT	Rdg.	MTAI
P	544.729	968.861	83.355	728.039	704.583
NP	468.000	900.621	131.917	1141.475	799.825
F	1.16 n.s.	1.08 n.s.	1.58 n.s.	1.57 n.s.	1.14 n.s.

Table 8.15 presents a comparison of the intercorrelations among the psychometric variables for the persists and nonpersists. None of the correlation coefficients were significantly different for the persists than for the nonpersists. In addition, the individual correlation seemed to fall within the range of values that would be expected on the basis of experience with other similar groups.

Table 8.15

A Comparison of the Intercorrelations of the Psychometric Variables for Persists and Nonpersists for Math-Science Majors (P = 111, NP = 18)

		ACE	MAT	Rdg.	MTAI
HSR	P	.51**	.28**	.27**	-.05
	NP	.26**	.03	-.03	.18*
		n.s.	n.s.	n.s.	n.s.
ACE	P		.56**	.54**	.10
	NP		.41**	.61**	-.23**
			n.s.	n.s.	n.s.
MAT	P			[illegible]**	.17
	NP			.14	-.17
				n.s.	n.s.
Rdg.	P				.05
	NP				-.03
					n.s.

*Denotes coefficient significantly larger than zero.
* = .05 level
** = .01 level

Academic Data

The performance of the persists and nonpersists in mathematics and science curriculums was not found to differ when over-all GPA and Ed 55 GPA were considered as indications of the quality of their work. The mean GPA values for persists were higher than for nonpersists on both GPA measures, though not significantly so. It was found that the nonpersists were more variable in their performance than were persists. This difference is indicated by the comparison of variances in Table 8.17.

Table 8.16

A Comparison of Mean Overall Grade Point Average and Mean Ed 55 Grade Point Average for Men Majoring in Mathematics and Science Who Were Persists and Nonpersists

	O/All GPA	Ed 55 GPA
P	2.81	2.73
NP	2.75	2.46
t	.61**	1.37**

Table 8.17

A Comparison of the Variances of Overall Grade Point Average and Ed 55 Grade Point Average for Men Majoring in Mathematics and Science Who Were Persists and Nonpersists

	O/All GPA	Ed 55 GPA
P	.159	.613
NP	.276	1.159
F	1.74 *	1.89 *

*Denotes coefficient significantly larger than zero.
* = .05 level

The third variable used as a measure of the quality of academic work during the period studied was probationary status. In Table 8.18 the Chi square value indicates that a significant relationship exists between probationary status and persistence for men in the math and science curriculums. The percentage values indicate that fewer than one man in ten who were never on probation were classified as nonpersists, whereas one out of three of those who were on probation were nonpersists. Stated in another way: of those who were nonpersists, two-thirds were, at some time, on probation; only one-third were never on probation. The two primary factors which determined probationary status were overall grade point average and the grade point average in the major field. Although it was not checked directly, it seems that the high mean and the small variance of the overall GPA distribution indicates that this variable seldom was the cause for being placed on probation. It may well be that the grades received in advanced courses in science and math required in their programs caused the students to be placed on probation and subsequently to be nonpersists.

Table 8.18

A Comparison of the Probationary Status for Men Majoring in Mathematics and Science Who Were Persists and Nonpersists

	On Probation		Never on Probation		Total	
	f	%	f	%	f	%
P	23	65.7	88	93.6	111	86.0
NP	12	34.3	6	6.4	18	14.0
Total	35	100.0	94	100.0	129	100.0

$X^2 = 16.43^{**}$

A Discriminant Analysis of the Criterion Groups

As in previous chapters, this section reports the multivariate comparison between persists and nonpersists. Two different analyses were made. The first utilized the nine variables available at entrance, and the second combined these with three academic variables collected during the study to make a total of twelve. The analysis of variance table indicates the effectiveness of the discrimination, and it is followed by the table of intercorrelations and the list of discriminant weights for each of the variables.

Criterion Groups at Entry

Table 8.19 gives the analysis of variance test of the effectiveness of the discrimination between persists and nonpersists using the nine at-entry variables. The "F" value indicates that the weightings established for the nine variables did not significantly separate persists from nonpersists. As noted previously, the effectiveness of the discriminant analysis depends jointly upon the means, the variances, and the intercorrelations among the variables. Because of the complexity of these relationships, it is difficult to attribute specific causes either for the lack of significance or for the presence of significance.

Table 8.19

Analysis of Variance Test of the Analysis of Persists and Nonpersists Who Were Men Majoring in Mathematics and Science Using the Nine Variables Available at Entry

Source	df	Sum of Squares	Mean Square	F
Between	9	.000108	.000012	.57
Within	119	.002605	.000021	

In Table 8.20 the intercorrelations among the variables are presented. Table 8.21 gives the standardized discriminant weights for each of the variables, showing that HSR was the only variable which received any substantial weighting.

Criterion Groups at Term

The significant "F" value in Table 8.22 indicates that the twelve variables available at the close of the study were weighted in such a way that an effective discrimination was made between persists and nonpersists majoring in the math and science fields. Table 8.23 presents the additional intercorrelations which the addition of three variables added to the matrix of intercorrelations given in Table 8.20.

Table 8.20

The Intercorrelations of the Nine Variables Used in the Discriminant Analysis of Persists and Nonpersists Who Were Men Majoring in Mathematics and Science

	ACE	MAT	Rdg.	MTAI	Entry	Age	H.S.	City
HSR	.48	.25	.22	-.03	.01	.13	.06	-.03
ACE		.54	.55	.06	.07	.06	.03	-.02
MAT			.51	.13	.08	-.15	.00	-.14
Reading				.04	.04	-.11	.07	.00
MTAI					-.02	-.05	-.11	-.12
Credits at Entry						-.03	-.10	-.08
Age							.04	.04
High School								.84

Table 8.21

Standardized Weights from the Discriminant Analysis of Persists and Non-Persists for the Nine Variables Available at Entry for Men Who Were Majoring in Mathematics and Science

Variables	Weights
HSR	-.0837
HS	.0225
Reading	.0185
ACE	.0176
MTAI	-.0172
Credits at Entry	-.0157
MAT	.0082
Size of City	-.0036
Age	-.0030

Table 8.22

Analysis of Variance Test of the Discriminant Analysis of Persists and Nonpersists Who Were Men Majoring in Social Studies Using the Twelve Variables Available at Term

Source	df	Sum of Squares	Mean Square	F
Between	12	.007280	.000606	3.25**
Within	116	.021671	.000186	

Table 8.23

Additional Intercorrelations of Variables for Discrimination Between Criterion Groups at Term for Math and Science Majors

	O/All GPA	55 GPA	Probation
55 GPA	.70		
Probation	-.45	-.35	
HSR	.17	.25	-.16
ACE	.30	.36	-.13
MAT	.38	.38	-.22
Rdg.	.32	.39	-.11
MTAI	.05	.21	-.02
Entry	.16	.16	.05
Age	.01	.11	-.03
H.S.	-.11	-.04	.07
City	-.16	-.18	.12

In Table 8.24 the discriminant weights suggest the reason for the significance when the twelve variables were used. The heaviest weighting was given probation and Ed 55 GPA, both of which were added to the nine variables. Overall GPA, which was also one of the academic variables added, was more effective than all but two of the nine at-entry variables. It was concluded that the twelve variables could classify men in math and science curriculums into persist and nonpersist groups. The largest contributing factors to this distinction were the variables more closely related to performance in the College of Education. It should also be noted, however, that HSR was a heavily weighted variable, as it was in the analyses for other curriculum majors.

Table 8.24

Standardized Weights from the Discriminant Analysis of Persists and Non-Persists for the Twelve Variables Available at Term for Men Who Were Majoring In Mathematics and Science

Variables	Weights
Probation	-.0820
Ed 55 GPA	.0814
HSR	-.0567
Size of City	.0343
O/All GPA	.0320
MTAI	-.0303
MAT	-.0295
Credits at Entry	-.0252
Age	-.0229
ACE	.0159
Reading	-.0086
HS	.0039

Summary

In this chapter the pattern of analysis established earlier in this report was followed to present the data collected for men in mathematics, natural science, and physical science curriculums. It was found that most of these men enter the College of Education from colleges on the campus of the University of Minnesota, primarily during the junior year. These men attended large public high schools or small public high schools, and came from communities of less than 10,000 in size and from large urban communities in about equal numbers. Data from high school records indicated that they were in the upper one-fourth of their class and in the upper one-third of the norm group on the ACE test of scholastic aptitude. When they entered the College of Education as juniors, their ages were distributed over a wide range; over half of them were older than the typical college junior. They were found to be comparable to the average College of Education junior on MAT and reading scores, but were far below the average college junior on MTAI scores. Over the three years studied, more than 25% of these juniors were placed on probation, even though their overall achievement was satisfactory in most cases.

A comparison of persists with nonpersists indicated little difference between them. Those who persisted tended to be very much like the nonpersists. The nonpersists had higher scores on all of the five psychometric variables than did the persists, but only one of them was significantly higher. Although nonpersists tended to be more variable in their academic performance, there were no differences between the mean achievement in overall GPA or Ed 55 GPA. A significantly higher number of nonpersists were placed on probation, however.

The multivariate comparison of persists with nonpersists utilizing the nine at-entry variables showed no differences between them. The addition of the three academic variables produced an effective discrimination between those who persisted and those who did not. This discrimination was primarily due to the contribution of the probation and Ed 55 GPA variables.

Chapter IX

The Four Curriculums Compared

Introduction

At its inception the research of which this study is a part made two fundamental assumptions. The first of these stated that there are important differences between the students in the various teacher education majors. The second asserted that men and women in the same curriculum are characterized by different patterns of scores on certain variables. It is the purpose of this chapter to investigate these assumptions within certain limitations which are noted after the general format of the chapter is presented.

This chapter has two main sections. The first presents the univariate comparisons made among the four teacher education majors. These data are considered for each of the majors separately in the preceeding four chapters. The following two questions were asked about the four curriculums:

1) Were the students who entered the four curriculums different on the various biographical, psychometric, and academic variables?

2) When the groups were classified into persists and nonpersists, what was the effect on the comparisons among the majors?

To provide answers for these two questions, three comparisons among the four curriculums were made on each of the biographical, psychometric, and academic variables. The first compared the four majors as they entered the College of Education; the second compared the persists, and the third compared the nonpersists. Appropriate tests of significance were made to indicate the extent of the differences in each of the three comparisons. The effect of applying the criterion of persistence is inferred from a comparison of the numerical value of the statistics used in making the comparisons. For example, if the Chi square or F statistic was larger when the persists in the four majors were compared than when the "at entry" groups were compared, then the conclusion is that the application of the criterion of persistence to the entry groups increased the discrimination among the majors. No tests of significance were employed in the comparison of the same test statistics from year to year.

In the second section of this chapter, one multivariate comparison among the four groups is presented. The analysis was performed to answer the following question:

> Considering the variables available at the time of admission, were there differences among those who persisted in the four curriculums?

The purpose of asking the question was to investigate, within the limitations described below, the usefulness of admissions data in classifying applicants by comparison with those who persist. If some evidence were found that admissions data could classify students into major fields, then such information would be useful to institutions as they make decisions regarding applicants and to students as they make decisions about entering teaching.

All interpretations of the comparisons made in this chapter are subject to at least one major limitation. Comparisons were based on data for women in two groups; Elementary IA and a combination of English, Speech, and Language Arts curriculums, and men in two different groups, Mathematics and Science curriculums combined, and the Social Studies curriculum. When the data collected for this study were compiled, there was not a sufficient number of both men and women in the four curriculums to permit a complete set of comparisons. Such comparisons can, however, be made when additional longitudinal data are available. The decision to make the analysis, recognizing the limitation, was based on the belief that the information provided would be important to the development of adequate descriptions of similarities and differences in the various teaching education majors.

Univariate Comparisons

This section explores the relationship between each of the four curriculum groups studied on each of the biographical, psychometric, and academic variables. Separate tables present the comparison of the curriculum groups at the time of admission, for the persists, and for the nonpersists. Since the biographical variables were categorical, the Chi square test of independence was made for each of the comparisons involving these variables. For the psychometric and academic variables the appropriate parametric tests of significance were used.

Biographical Data

Tables 9.1a, 9.1b, and 9.1c present the comparison of the four curriculum groups by school of prior registration. Table 9.1a indicates that there was a relationship between school of prior registration and the curriculum for the groups at the time of admission. The table shows that a larger percent of the women in English, Speech, and Language Arts (23.6%) came from off campus schools than was true for the total of the four groups (12.8%). Sixty percent of the significant Chi square value can be attributed to this fact. Another twenty percent of the Chi square value came from the small number of Math-Science majors (7.0%) who came from off campus schools.

Table 9.1b indicates that the same relationship was found for the persists in the four curriculums. Although the size of the Chi square value was larger than for the at-entry groups, the pattern of the data is similar to that of the groups at the time of admission.

Table 9.1c indicates that the relationship between the nonpersists in the four major fields was not significant. There was no relationship between the school of prior registration and the four majors when the nonpersists were considered.

When the four major groups were considered at the time of admission, there was a relationship between the school previously attended and the curriculum major. When the entering group was divided into those who were persists and those who were nonpersists, the relationship which was found between the previous school and curriculum major for the at-entry group held true for the persist group, but not for the nonpersist group. The larger Chi square value for the persist group when compared with the at-entry group indicates that the separation into persist and nonpersist groups did increase the relationship between school of prior registration and curriculum major.

Table 9.1a

A Comparison of Students Entering Three Curriculums by the School of Prior Registration

	Off Campus Transfers		On Campus Transfers		Total	
	f	%	f	%	f	%
English	26	23.6	84	76.4	110	100
Social Studies	9	8.7	95	91.3	104	100
Mathematics	9	7.0	120	93.0	129	100
Total	44	12.8	299	87.2	343	100

X^2 = 17.10**

Table 9.1b

A Comparison of Persists in Three Curriculums by the School of Prior Registration

	Off Campus Transfers		On Campus Transfers		Total	
	f	%	f	%	f	%
English	21	23.1	70	76.9	91	100
Social Studies	6	7.6	73	92.4	79	100
Mathematics	7	6.3	104	93.7	111	100
Total	34	12.1	247	87.9	281	100

X^2 = 19.06**

Table 9.1c

A Comparison of Nonpersists in Three Curriculums by the School of Prior Registration

	Off Campus Transfers		On Campus Transfers		Total	
	f	%	f	%	f	%
English	5	26.3	14	73.7	19	100
Social Studies	3	12.0	22	88.0	25	100
Mathematics	2	11.1	16	88.9	18	100
Total	10	16.1	52	83.9	62	100

X^2 = 2.02 n.s.

Table 9.2a

A Comparison of Students Entering Three Curriculums by the Level of Prior Preparation

	Junior		Senior		Total	
	f	%	f	%	f	%
English	102	92.7	8	7.3	110	100
Social Studies	87	83.7	17	16.3	104	100
Mathematics	109	84.5	20	15.5	129	100
Total	298	86.9	45	13.1	343	100

X^2 = 4.87 n.s.

Table 9.2b

A Comparison of Persists in Three Curriculums by the Level of Prior Preparation

	Junior		Senior		Total	
	f	%	f	%	f	%
English	85	93.4	6	6.6	91	100
Social Studies	68	86.1	11	13.9	79	100
Mathematics	94	84.7	17	15.3	111	100
Total	247	87.9	34	12.1	281	100

X^2 = 3.91 n.s.

Table 9.2c

A Comparison of Nonpersists in Three Curriculums by the Level of Prior Preparation

	Junior		Senior		Total	
	f	%	f	%	f	%
English	17	89.5	2	10.5	19	100
Social Studies	19	76.0	6	24.0	25	100
Mathematics	15	83.3	3	16.7	18	100
Total	51	82.3	11	17.7	62	100

X^2 = 1.42 n.s.

Table 9.3a

A Comparison of Students Entering Four Curriculums by the Size and Type of High School Attended

Schools	Women				Men					
	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
Public										
>2,000	282	56.9	45	40.9	56	53.8	56	43.4	439	52.3
1-2,000	67	13.5	14	12.7	14	13.5	20	15.5	115	13.7
<1,000	106	21.4	38	34.5	22	21.2	43	33.3	209	24.9
Private										
>1,000	3	.6	1	0.9	5	4.8	6	4.7	15	1.8
450-1,000	17	3.4	2	1.8	2	1.9	1	.8	22	2.6
<450	13	2.6	3	2.7	4	3.8	1	.8	21	2.5
Others**	7	1.4	7	6.4	1	1.0	2	1.6	17	2.0
Total	495	100.0	110	100-.1	104	100.0	129	100.0	838	100.0

*X^2 = 16.92**

*Chi Square was computed by considering three categories: Large Public, > 2,000, Small Public, < 2,000, and Private

**Others include out of state, non grads, and no information

Table 9.3b

A Comparison of Persists in Four Curriculums by the Size and Type of High School Attended

Schools	Women				Men					
	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
Public										
>2,000	255	58.5	40	44.0	38	48.1	47	42.3	380	53.1
1-2,000	57	13.1	12	13.2	13	16.5	18	16.3	100	13.9
<1,000	89	20.4	30	33.0	19	24.1	38	34.3	176	24.5
Private										
>1,000	3	.7	0	0.0	5	6.3	4	3.6	12	1.7
450-1,000	15	3.4	2	2.2	1	1.3	1	.9	19	2.6
<450	12	2.8	2	2.2	2	2.5	1	.9	17	2.4
Others**	5	1.1	5	5.5	1	1.3	2	1.8	13	1.8
Total	436	100.0	91	100.1	79	100.1	111	100.0	717	100.0

*X^2 = 17.47**

*Chi Square was computed by considering three categories: Large Public, > 2,000, Small Public, < 2,000, and Private

**Others include out of state, non grads, and no information

Table 9.3c

A Comparison of Nonpersists in Four Curriculums by the Size and Type of High School Attended

Schools	Women				Men				Total	
	Elementary		English		Soc. Studies		Math-Science			
	f	%	f	%	f	%	f	%	f	%
Public										
>2,000	27	45.8	5	26.3	18	72.0	9	50.0	59	48.8
1-2,000	10	16.9	2	10.5	1	4.0	2	11.1	15	12.4
<1,000	17	28.8	8	42.1	3	12.0	5	27.8	33	27.3
Private										
>1,000	0	0.0	1	5.3	0	0.0	2	11.1	3	2.5
450-1,000	2	3.4	0	0.0	1	4.0	0	0.0	3	2.5
>450	1	1.7	1	5.3	2	8.0	0	0.0	4	3.3
Others**	2	3.4	2	10.5	0	0.0	0	0.0	4	3.3
Total	59	100.0	19	100.0	25	100.0	18	100.0	121	100.0

*X^2 = 11.10**

*Chi Square was computed by considering three categories: Large Public, >2,000, Small Public, <2,000, and Private
**Others include out of state, non grads, and no information

Level of Prior Preparation. The results of the comparison of the students in the three, two-year, academic curriculums, omitting the four-year Elementary program, and the level at which they entered the teacher education program is presented in Tables 9.2a, 9.2b, and 9.2c. These tables indicate that no significant relationship was found between the curriculum and the level at which the students entered the program, regardless of whether the comparison was concerned with the students at the time of admission or those who were persists and nonpersists. These results indicate that there is no tendency for students in a particular curriculum to be admitted at a particular time. The percentages indicate that there was a tendency for more of the men in Social Studies and Math-Science to enter at the senior level than was true for women in English, Speech, and Language Arts, but this relationship was not strong enough to cause the Chi square value to reach statistical significance.

Size and Type of High School Attended. When the students in the four curriculums studied were compared by the size and type of high school they attended, a significant relationship was found for all three of the comparisons. Considering the four curriculums at the time of entry into the College of Education, Table 9.3a, a larger percent of English, Speech, and Language Arts majors and the Math-Science majors attended small public high schools, and fewer of students entering these two curriculums were graduates of large public high schools. From these data it may be concluded that the type and size of high school attended was related to the curriculum major.

An analysis of the data in Table 9.3b found that the significant relationship between size and type of high school and curriculum major for the persists followed a pattern similar to that found in the four majors at entry. Those who were persists in English and Math-Science curriculums were most often graduates of small public high schools and least often graduates of large public high schools. The reverse was true of those in Elementary Education. The larger Chi square value in Table 9.1b indicates that the relationship was stronger for the persists than for the entry group.

The significant relationship between nonpersists and the four curriculums and the size and type of high school attended, Table 9.1c, can be attributed to a much different pattern than the ones found in the previous two tables. In the case of the nonpersists, over half of the significant Chi square value can be attributed to the fact that the Social Studies men who were nonpersists were more often from large public high schools and less often from small public high schools than was true for the four curriculums in total.

In the preceeding four chapters, tests of the relationship between persistence and size and type of high school attended computed for each curriculum major separately failed to show any significant difference between the patterns of high school attended for persists and nonpersists. In addition, the preceding three tables established that these four curriculums were different in the size and type of high school attended when considered as an entry group, a persist group, or a nonpersist group. This is to say that the four groups, as they entered or as persists or nonpersists, were not graduates of the same size and type of high school.

Size of High School Community. Tables 9.4a, 9.4b, and 9.4c present the comparison of the four curriculum groups by the size of the high school community. As is noted in Table 9.4a, the categories of high school community were reduced to four for the purposes of making the comparison. The category 10-20,000 population was combined with greater than 20,000, and the out of state category was omitted from the computations. In Table 9.4a the Chi square value of 31.87 indicates a significant relationship between the size of the high school community and the curriculum into which students were admitted. The significance can be attributed to three of the majors, Elementary, English, and Math-Science, and within these majors primarily to the categories of suburban and less than 10,000 in population. This interaction of teacher education major and size of high school community can be attributed to the following relationships. Elementary women were more often graduates of suburban high school communities and less often from high schools in communities of less than 10,000 than was true for the group as a whole. The English, Speech, and Language Arts majors were more often from high school communities of less than 10,000. The Math-Science majors least often attended high school in suburban communities and most often in communities of less than 10,000.

When persists in the four curriculums were compared in terms of the size of the community where they attended high school, Table 9.4b indicates the significant Chi square value (29.99) was approximately the same magnitude as the value in the previous table, (31.87). In addition, it is the same pattern of relationships that contributes to the significant Chi square value that is true of the previous variable noted above.

Table 9.4a

A Comparison of Students Entering Four Curriculums by the Size of the High School Community

	Women				Men					
Community	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
Urban	258	52.1	41	37.3	57	54.8	56	43.4	412	49.2
Suburban	64	12.9	6	5.5	9	8.7	5	3.9	84	10.0
>20,000	13	2.6	5	4.5	1	1.0	2	1.6	21	2.5
10-20,000	22	4.4	4	3.6	5	4.8	8	6.2	39	4.7
<10,000	133	26.9	48	43.6	31	29.8	56	43.4	268	32.0
Out of State**	5	1.1	6	5.5	1	1.0	2	1.6	14	1.7
Total	495	100.0	110	100.0	104	100.0	129	100.0	838	100.0

*X^2 = 31.87**

*Chi Square was computed by considering four categories: Urban, Suburban, >10,000, and <10,000

**Out of state not included in Chi Square

Table 9.4b

A Comparison of Persists in Four Curriculums by the Size of the High School Community

	Women				Men					
Community	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
Urban	232	53.2	35	38.5	41	51.9	47	42.3	355	49.5
Suburban	55	12.6	5	5.5	7	8.9	4	3.6	71	9.9
>20,000	12	2.8	3	3.3	0	0.0	2	1.8	17	2.4
10-20,000	19	4.4	3	3.3	4	5.1	6	5.4	32	4.5
<10,000	114	26.1	41	45.0	26	32.9	50	45.1	231	32.2
Out of State**	4	.9	4	4.4	1	1.3	2	1.8	11	1.5
Total	436	100.0	91	100.0	79	100.0	111	100.0	717	100.0

*X^2 = 29.99**

*Chi Square was computed by considering four categories: Urban, Suburban, >10,000 and <10,000

**Out of state not included in Chi Square

Table 9.4c

A Comparison of Nonpersists in Four Curriculums by Size of the High School Community

	Women				Men					
Community	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
Urban	26	44.0	6	31.6	16	64.0	9	50.0	57	47.1
Suburban	9	15.3	1	5.3	2	8.0	1	5.6	13	10.7
>20,000	1	1.7	2	10.5	1	4.0	0	0.0	4	3.4
10-20,000	3	5.1	1	5.3	1	4.0	2	11.1	7	5.8
<10,000	19	32.2	7	36.8	6	20.0	6	33.3	37	30.5
Out of State**	1	1.7	2	10.5	0	0.0	0	0.0	3	2.5
Total	59	100.0	19	100.0	25	100.0	18	100.0	121	100.0

*χ^2 = 7.49 n.s.

*Chi Square was computed by considering four categories: Urban, Suburban, >10,000, and <10,000

**Out of state not included in Chi Square

Table 9.4c presents comparable data for those who were categorized as nonpersists. The Chi square value for this comparison was 7.49, a value not significantly larger than would have been expected by chance. For the nonpersists there was no relationship between major and size of the community where they attended high school. The proportion of nonpersists for the four majors was not different in the four categories of community size.

From these data it may be concluded that the size of the community in which students went to high school is different for the four majors at the time of admission and for those who persist. The nonpersists as a group were distributed among the categories of community size without regard to curriculum major.

Age at Entrance into the Junior Year. Tables 9.5a, 9.5b, and 9.5c present the comparisons of ages of students in the four curriculums at the time of entrance into the junior year. Because of the small number of people in some of the nine original age categories, the analysis was performed by combining the data into three age groups; those nineteen and younger, twenty, and twenty-one or older.

In Table 9.5a, the Chi square value (140.53), indicates a significant relationship between the four curriculums and the age at entrance into the junior year. More than 60 percent of this large Chi square value can be attributed to the fact that the percent of Social Studies and Math-Science men in the age group twenty-one and over (about 60%) was twice as large as for the total group. The English, Speech, and Language Arts majors were distributed among the age categories similar to the distribution of the total group, but the Elementary majors tended to be younger.

Table 9.5a

A Comparison of Students Entering Four Curriculums by Age at Entrance into the Junior Year

	Women				Men					
Age	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
>26	20	4.0	5	4.5	12	11.5	13	10.1	50	6.0
25	5	1.0	0	0.0	8	7.7	13	10.1	26	3.1
24	5	1.0	2	1.8	15	14.4	11	8.5	33	3.9
23	5	1.0	2	1.8	11	10.6	14	10.9	32	3.8
22	17	3.4	4	3.6	7	6.7	7	5.4	35	4.2
21	49	9.9	7	6.4	11	10.6	19	14.7	86	10.3
20	304	61.4	76	69.2	38	36.5	49	38.0	467	55.7
19	87	17.6	14	12.7	2	1.9	3	2.3	106	12.6
<18	3	0.6	0	0.0	0	0.0	0	0.0	3	.4
Total	495	100.0	110	100.0	104	100.0	129	100.0	838	100.0

*X^2 = 140.53**

*Chi Square was computed by considering three age categories: >21, 20, and <19.

Table 9.5b

A Comparison of Persists in Four Curriculums by Age at Entrance into the Junior Year

	Women				Men					
Age	Elementary		English		Soc. Studies		Math-Science		Total	
	f	%	f	%	f	%	f	%	f	%
>26	16	3.7	4	4.4	8	10.1	11	9.9	39	5.4
25	2	0.5	0	0.0	6	7.6	13	11.7	21	2.9
24	4	0.9	1	1.1	12	15.2	10	9.0	27	3.8
23	4	0.9	2	2.2	8	10.1	13	11.7	27	3.8
22	15	3.4	3	3.3	4	5.1	7	6.3	29	4.0
21	44	10.2	5	5.5	9	11.4	15	13.5	73	10.2
20	274	62.8	67	73.6	30	40.0	40	36.1	411	57.3
19	74	17.0	9	9.9	2	2.5	2	1.8	87	12.2
<18	3	0.7	0	0.0	0	0.0	0	0.0	3	.4
Total	436	100.0	91	100.0	79	100.0	111	100.0	717	100.0

*X^2 = 129.24**

*Chi Square was computed by considering three age categories: >21, 20, and <19.

Table 9.5c

A Comparison of Nonpersists in Four Curriculums by Age at Entrance into the Junior Year

Age	Women				Men				Total	
	Elementary		English		Soc. Studies		Math-Science			
	f	%	f	%	f	%	f	%	f	%
>26	4	6.8	1	5.3	4	16.0	2	11.1	11	9.0
25	3	5.1	0	0.0	2	8.0	0	0.0	5	3.3
24	1	1.7	1	5.3	3	12.0	1	5.6	6	4.9
23	1	1.7	0	0.0	3	12.0	1	5.6	5	4.1
22	2	3.4	1	5.3	3	12.0	0	0.0	6	5.0
21	5	8.5	2	10.5	2	8.0	4	22.2	13	10.7
20	30	50.8	9	47.3	8	32.0	9	50.0	56	42.3
19	13	22.0	5	26.3	0	0.0	1	5.6	19	15.7
<18	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	59	100.0	19	100.0	25	100.0	18	100.0	121	100.0

$*\chi^2 = 17.94**$

*Chi Square was computed by considering three age categories: >21, 20, and <19.

Table 9.5b shows that the age at entrance into the junior year for the persists is related to major fields in the same way as in the total entering group. The Chi square value is slightly smaller, but the same pattern holds. The Social Studies and Math-Science men were older than the group and the Elementary women were younger.

In Table 9.5c, the relationship between the four majors and the age at entrance into the junior year is compared for the nonpersists. Although the Chi square value still is significantly larger than chance, the magnitude of the value is one-seventh the size found in the previous tables. Over half of this significant Chi square value can be attributed to the Social Studies men. Two-thirds of all of the Social Studies nonpersists were twenty-one years of age or older compared to one-third for the total group.

The three previous tables indicate that the age at admission is related to the curriculum major before and after applying the criterion of persistence, though the strength of the relationship is considerably less for the nonpersists. The pattern of the data is consistent. Larger proportions of older students were found in the Social Studies and Math-Science majors, and this fact accounted for most of the significance.

Psychometric Data

In Tables 9.6a, 9.6b, and 9.6c, the four curriculums are compared on the five psychometric variables for the total group at entry, the persists, and the nonpersists. The F.tests indicated in Table 9.6a show that there were significant differences among the means of each of the five psychometric variables for the four curriculums. The women in English, Speech, and Language Arts had the highest mean score on all of the variables except MTAI. The Social Studies men had the lowest mean HSR, the women in Elementary had the lowest ACE, MAT, and Reading score means, but the Math-Science majors had the lowest mean MTAI scores.

Table 9.6b indicates that there were significant differences among the four majors who were persists on all five of the psychometric variables. The English, Speech, and Language Arts majors again had the highest mean scores on all the variables except the MTAI. The Social Studies men had the lowest mean HSR and ACE; the Elementary women had the lowest MAT and Reading scores; and the Math-Science majors had the lowest MTAI scores.

In Table 9.6c the comparisons among the nonpersists in the four majors are made on each of the five psychometric variables. The F tests indicate that there were no differences among the nonpersists on mean HSR or mean MTAI scores, but there were significant differences among the majors on the other three variables. Although no statistical contrasts were made to see specifically where the significances were, it is clear that the Elementary majors were the lowest of the nonpersists on the ACE, MAT, and Reading tests.

Tables 9.7a, 9.7b, and 9.7c present a comparison of the variances of the four curriculums on the five psychometric variables. In the first table, the only significant difference which was found among the four groups was for HSR. The variances indicate that the English, Speech, and Language Arts majors are a very homogeneous group with regard to HSR. The variance of the Elementary majors is nearly three times as large as the English majors, and the variance of the Social Studies and Math-Science majors is more than four times as great as the English majors.

In Table 9.7b, the relationship is the same as the one found in the previous table. The only variances which were significantly different among the four majors were those for HSR. Again, the English persists were much more homogeneous than were the other three majors. In Table 9.7c the results indicate that there were no significant differences among the variances of the five psychometric variables for the nonpersists.

From the Chi square values which indicate the variability of HSR variances, it may be concluded that the criterion of persistence increases the variability of HSR in the groups studied. English, Speech and Language Arts and Elementary persists are more homogeneous with regard to HSR than the entering group and the Social Studies and Math-Science men. For the remaining psychometric variables, the Chi square values for the persists were higher than for the entering groups, indicating more variability among the persists. With the exception of ACE the nonpersists were also more variable than the entering groups.

In Tables 9.8a, 9.8b, and 9.8c two different comparisons are made concerning the intercorrelations among the five psychometric variables for the four groups. The first, $R_1 = R_2 = R_3 = R_4 =$, (where R stands for population parameter, rho), tests the hypothesis that all of the correlations are equal to zero. The second,

Table 9.6a

A Comparison of Students Entering Four Curriculums on the Means of Five Psychometric Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	"F"
HSR	78.7	88.6	69.4	74.5	20.0**
ACE	53.3	75.4	55.9	65.3	21.4**
MAT	60.3	68.6	65.1	67.9	34.0**
Rdg.	75.5	106.1	96.7	87.0	37.8**
MTAI	538.7	537.3	526.0	517.4	23.2**

Table 9.6b

A Comparison of Persists in Four Curriculums on the Means of Five Psychometric Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	"F"
HSR	79.8	90.1	68.0	73.7	23.4**
ACE	54.2	78.2	53.6	65.8	20.6**
MAT	60.8	69.6	64.5	68.2	29.2**
Rdg.	76.3	100.2	92.3	88.2	34.5**
MTAI	538.7	536.9	524.8	516.7	22.6**

Table 9.6c

A Comparison of Nonpersists in Four Curriculums on the Means of Five Psychometric Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	"F"
HSR	70.2	81.2	73.8	79.6	2.00 n.s.
ACE	46.7	62.0	63.0	62.1	5.82**
MAT	56.1	63.8	67.2	66.5	9.87**
Rdg.	69.7	98.8	110.7	79.8	11.84**
MTAI	538.7	539.9	533.2	521.6	1.66 n.s.

Table 9.7a

A Comparison of Students Entering Four Curriculums on the Variances of Five Psychometric Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	χ^2
HSR	331.87	116.79	526.66	522.67	70.06**
ACE	871.61	703.42	952.83	772.84	3.27 n.s.
MAT	105.06	104.57	94.25	101.53	.50 n.s.
Rdg.	940.13	949.44	825.30	916.70	.77 n.s.
MTAI	788.28	791.35	752.84	829.84	.39 n.s.

Table 9.7b

A Comparison of Persists in Four Curriculums on the Variances of Five Psychometric Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	χ^2
HSR	308.41	87.68	544.41	540.00	81.72**
ACE	870.72	671.28	968.86	769.65	3.68 n.s.
MAT	103.00	99.79	83.36	103.31	1.46 n.s.
Rdg.	963.67	931.19	728.04	847.68	2.84 n.s.
MTAI	740.74	809.45	704.58	848.05	1.19 n.s.

Table 9.7c

A Comparison of Nonpersists in Four Curriculums on the Variances of Five Psychometric Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	χ^2
HSR	427.83	251.96	468.00	410.61	2.26 n.s.
ACE	820.95	879.88	900.62	793.52	.14 n.s.
MAT	100.59	122.48	129.68	90.03	1.02 n.s.
Rdg.	747.38	969.54	1141.48	1363.09	3.29 n.s.
MTAI	1150.91	675.19	909.02	712.03	2.85 n.s.

Table 9.8a

A Comparison of Students Entering the Four Curriculums on the Intercorrelations Between the Five Psychometric Variables

		ACE	MAT	Rdg.	MTAI
HSR	1.	110.53**	108.85**	79.44**	13.82**
	2.	3.98	5.11	9.7*	10.98*
ACE	1.		365.74**	399.21**	31.50**
	2.		1.87	5.65	12.84**
MAT	1.			414.49**	25.15**
	2.			7.18	1.76
Rdg.	1.				15.32**
	2.				4.07

Table 9.8b

A Comparison of Persists in Four Curriculums on the Intercorrelations Between the Five Psychometric Variables

		ACE	MAT	Rdg.	MTAI
HSR	1.	95.83**	80.18**	59.88**	7.77
	2.	8.16*	4.13	9.07*	5.79
ACE	1.		322.19**	336.05**	27.04**
	2.		4.90	8.60*	9.46*
MAT	1.			367.72**	16.46**
	2.			5.84	1.23
Rdg.	1.				13.26*
	2.				2.57

Table 9.8c

A Comparison of Nonpersists in Four Curriculums on the Intercorrelations Between the Five Psychometric Variables

		ACE	MAT	Rdg.	MTAI
HSR	1.	10.36*	17.78**	19.07**	9.40
	2.	.37	2.36	4.92	8.73*
ACE	1.		38.29**	58.51**	10.58*
	2.		2.27	.22	9.30*
MAT	1.			47.06**	13.86**
	2.			4.52	4.68
Rdg.	1.				9.41
	2.				8.10*

1. Values reported are Chi square values testing the hypothesis $\rho_1=\rho_2=\rho_3=\rho_4=0$
2. Values reported are Chi Square values testing the hypothesis $\rho_1=\rho_2=\rho_3=\rho_4$

$R_1 = R_2 = R_3 = R_4$, tests the hypothesis that the correlation coefficients between two psychometric variables for the four groups are equal. The first hypothesis, considering the four correlations, tests whether the relationship between the two variables is larger than could be expected by chance, and the second hypothesis is an independent test of whether the four correlations are significantly different. The reader should remember that for the relatively small numbers of nonpersists the r's are less stable thus requiring larger differences for significance. (The correlations tested are presented in the previous chapters.)

Table 9.8a indicates that all of the intercorrelations among the psychometric variables were larger than zero. Three differences were found among the majors. The HSR-Reading correlation differed among the majors. For the Social Studies and Math-Science men r equaled .01 and .22, respectively, while for the Elementary and English, Speech and Language Arts women r equaled .32 and .37, respectively. The other two significant differences among the groups both involved MTAI: HSR with MTAI and ACE with MTAI. The values of r when HSR and MTAI were correlated ranged from -.16 for English, Speech and Language Arts majors to .14 for Elementary majors. Correlations of ACE with MTAI ranged from -.13 for English, Speech and Language Arts women to .20 for Elementary women.

The comparisons of the intercorrelations for the persists showed that all values were larger than zero except for the correlations between HSR and MTAI which ranged from -.12 to .10. Significant differences were found among four intercorrelations for the persists. These differences are shown in the tabulation below:

	HSR & ACE	HSR & MAT	ACE & Reading	ACE & MTAI
Elementary	.33	.34	.64	.18
English	.17	.29	.44	-.11
Social Studies	.29	.14	.51	.32
Math-Science	.51	.26	.54	.10

It should be noted that correlations involving HSR for English, Speech and Language Arts women are surely affected by the limited variability of HSR for that group. The most interesting contrast occurs in the correlations between HSR and ACE for the four groups. The fact that the highest relationship between high school achievement (HSR) and measured ability in high school (ACE) was found for Math-Science men and the lowest for English, Speech and Language Arts women was certainly contrary to expectations.

For the nonpersists only two sets of intercorrelations were found to be equal to zero, both involving MTAI: HSR with MTAI and Reading with MTAI. The only three sets of r's which showed differences among the four groups who were nonpersists also involved correlations with MTAI. The actual correlations are listed below.

Table 9.9a

A Comparison of the Persists in the Four Curriculums on the Means of Two Academic Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	"F"
O/all GPA	2.67	2.88	2.81	2.72	7.03**
Ed 75/55 GPA	2.51	2.84	2.73	2.62	5.31**

Table 9.9b

A Comparison of the Nonpersists in the Four Curriculums on the Means of Two Academic Variables

	Women		Men		
Variables	Elementary	English	Soc. Studies	Math-Science	"F"
O/all GPA	2.26	2.62	2.75	2.18	7.14**
Ed 75/55 GPA	1.82	2.50	2.46	1.83	4.15**

	HSR with MTAI	ACE with MTAI	Reading with MTAI
Elementary	.34	.35	.37
English	-.33	-.19	-.34
Social Studies	-.19	-.22	-.08
Math-Science	.19	-.23	-.04

It is apparent that the differences among the r's for these nonpersists can be attributed to the contrast between the Elementary and English, Speech and Language Arts women.

Table 9.10a

A Comparison of the Persists in Four Curriculums on the Variances of Two Academic Variables

Variables	Women Elementary	Women English	Men Soc. Studies	Men Math-Science	X^2
O/all GPA	.2200	.1613	.1593	.2549	9.82*
Ed 75/55 GPA	.5795	.7428	.6127	.6144	3.77 n.s.

Table 9.10b

A Comparison of the Nonpersists in Four Curriculums on the Variances of Two Academic Variables

Variables	Women Elementary	Women English	Men Soc. Studies	Men Math-Science	X^2
O/all GPA	.3178	.3105	.2761	.2023	1.28 n.s.
Ed 75/55 GPA	.9942	.3333	1.11590	.5273	17.64**

The general affect of the applying the criterion of persistence to the four groups was to reduce the variability among the psychometric intercorrelations. In nearly every instance the Chi square value, which was an index of the variability of the correlations for the four groups, was smaller for the persists and nonpersists than for the groups at the time of admission. Thus the persists and nonpersists in the four curriculum groups studied were more homogeneous as indicated by the psychometric intercorrelations than were the same groups at the time they entered the College.

Academic Data

Since the academic data were collected after the students had been admitted and represent performance in the College, no data were available at admission. The only comparisons possible were between the persists and nonpersists. In Table 9.9a, the four curriculums are compared on their mean grade point average for all courses completed (overall GPA) and for the first professional sequence, Ed 75, Ed 55 GPA. The F tests indicate that there were significant differences among the four curriculums on both GPA indices. The data indicate that the English, Speech, and Language Arts majors had the highest mean over-all GPA and Ed 75, Ed 55 GPA, and Elementary majors had the lowest mean GPA. It should be noted, however, that direct comparisons among the four groups on the basis of Ed 75, Ed 55 GPA have one major shortcoming. Elementary majors had taken Ed 75, and all three other majors had taken the course numbered Ed 55. Table 9.9b makes the comparison among the four curriculums for those who did not persist.

Table 9.11a

A Comparison of Persists in the Four Curriculums on Probationary Status

	Probation		Non-Probation		Total	
	f	%	f	%	f	%
Elementary--all years	77	65.3	359	59.9	436	60.8
English, Speech, and Language Arts	6	5.1	85	14.2	91	12.7
Social Studies	12	10.2	67	11.2	79	11.0
Math-Science	23	19.5	88	14.7	111	15.5
Total	118	100.0	599	100.0	717	100.0

$X^2 = 8.48*$

Table 9.11b

A Comparison of Nonpersists in the Four Curriculums on Probationary Status

	Probation		Non-Probation		Total	
	f	%	f	%	f	%
Elementary--all years	26	59.1	32	41.6	58	47.9
English, Speech, and Language Arts	2	4.5	18	23.4	20	16.5
Social Studies	4	9.1	21	27.3	25	20.7
Math-Science	12	27.3	6	7.8	18	14.9
Total	44	100.0	77	100.0	121	100.0

$X^2 = 19.63**$

The table indicates that the four curriculums were different in the mean GPA for both of the academic variables. The over-all GPA for nonpersists was the highest for those Social Studies majors and lowest for the Math-Science majors. Grades in Ed 75 or Ed 55 were lowest for the Elementary and Math-Science nonpersists.

Tables 9.10a and 9.10b present a comparison of the variances of the GPA variables for the persists and nonpersists. There were significant differences among the variances of the persists on over-all GPA and among the nonpersists in the Ed 75, Ed 55 GPA. The Social Studies majors who persisted were the most homogeneous of all the majors in their over-all GPA and those who did not persist were the most heterogeneous in their achievement in the first professional sequence of courses.

Tables 9.11a and 9.11b present the scholastic probation data for the persists and nonpersists for the four majors. The Chi square test of independence presented in Table 9.11a indicates that probationary status and curriculum major were not independent. Considering the total of the four majors, about 16 percent of the 717 students who persisted were on probation at some time. Among the majors, however, this percent varied from as little as seven percent for the English majors to as high as 20 percent for the Math-Science majors. When compared to the persists, the data for the nonpersists in the four curriculums in Table 9.11b are striking. About 36 percent of the total of 121 nonpersists were on probation at some time. This percentage varied a great deal, however, among the majors. Only ten percent of the English, Speech, and Language Arts nonpersists were on probation, but as high as two out of three of the Math-Science nonpersists were on probation at some time or another.

In comparing the four curriculums on the academic variables used in this study, several significant differences have been noted. The differences occur among both persists and nonpersists. These differences are also related to their probationary status. On the average, the English, Speech, and Language Arts majors have higher mean achievement than do the other majors, and women in this major are least likely to be on probation of any of the groups studied. The Social Studies majors achieved nearly as high as the English, Speech, and Language Arts majors on the average, and were also infrequently on probation regardless of whether they persisted or not. Among the Elementary IA and Math-Science majors, however, the grades for the persists and nonpersists and whether or not they were on probation follow a different pattern. For both groups, the nonpersists averaged below a C (2.0) in their first professional courses, and for both groups the proportion of nonpersists who were on probation at some time was considerably different for the persists and the nonpersists. Such was not the case in the other two majors. Thus, it may be concluded that the patterns of achievement and probation were significantly different among the four majors studied.

Table 9.12

Means for the Twelve Variables in the Generalized Distance Analysis of the Persists in the Elementary IA (1957-58), English-Language Arts-Speech, Social Studies and Mathematics-Science Programs

Variables	Elementary IA 1957-1958 N=134	English-Language Arts-Speech N=91	Social Studies N=79	Mathematics-Science N=111
HSR	79.4	90.1	67.9	73.7
ACE	53.6	78.2	53.6	65.8
MAT	60.3	69.6	64.5	68.1
Reading	74.9	110.2	92.3	88.1
MTAI	540.1	536.9	524.8	516.7
Entry	2.9	4.0	4.1	4.1
Age	36.4	36.4	35.0	34.8
High School	2.2	3.0	2.6	2.9
City	2.4	3.2	2.6	3.1

Table 9.13

The Pooled "Within Variance" and Covariance Matrix in the Generalized Distance Analysis of the Persists in the Elementary IA (1957-58), English-Language Arts-Speech, Social Studies and Mathematics-Science Program

Variables	HSR	ACE	MAT	Reading	MTAI	Entry	Age	High School	City
HSR	377.92	133.51	51.71	134.93	-4.56	-1.42	12.06	-3.67	-.92
ACE		854.02	174.23	548.78	75.40	-1.60	9.17	-1.35	-1.02
MAT			106.27	201.31	27.31	-.03	-3.36	.48	-.10
Reading				969.01	50.19	.39	-11.30	.81	-.52
MTAI					787.95	-.68	.88	-3.79	-2.27
Entry						.66	-.21	.15	.10
Age							8.80	-.75	-.65
High School								3.35	2.76
City									3.47

Multivariate Comparisons

In the previous section the differences among the four curriculums were presented separately for each of the variables considered. In this section, the generalized distance analysis is used to compare the four majors simultaneously on the biographic, psychometric, and academic variables. Although other comparisons are possible, the investigators chose to limit the analysis in this section to a comparison of the persists using the nine variables which were available for all students at the time they entered the College. From these data, it is possible to answer the following question: Are the students who persisted in the four curriculums different, considering the variables available at the time of admission? Before a presentation of the data, a short, non-technical description of the generalized distance technique is given as an introduction to the discussion of the data and the results.

The Generalized Distance Function

The use of the multiple regression method to find solutions to multivariate problems which require the prediction of a continuous, quantitative criterion from a linear combination of independent variables is well known and frequently used in educational research. Less often employed, and perhaps less well known, is the solution to the multivariate problem which seeks the linear combination of independent variables that will give the maximum discrimination among groups classified on the basis of a discrete, qualitative criterion. To provide a measure of the amount of overlap or divergence between identifiable criterion groups, Mahalanobis originated the generalized distance function, called D^2. This method determines the weighting factors for each variable such that the linear combination of variables provides the maximum discrimination among the criterion groups. After the optimum weights have been determined, they can be used to place individuals into the criterion group they most closely resemble. The question posed in this study, as stated in the introduction to this section, necessitates only determining whether or not the variables can effectively discriminate among the criterion groups. In other words, is there a unique pattern of scores which characterizes the different criterion groups? No attempt was made to cross-validate the results by actually classifying a new group of students. In this study, the D^2 technique was used to provide a multivariate description of four groups of students.

The solution to the problem involves the computation of the variance-covariance matrix for each group. The total sum of squares of a linear function of the variables for the groups is divided into the "between means of the groups sums of squares" and "within groups sums of squares." The optimum weights are those which maximize the ratio of the "between means" to the "within groups" sums of squares. The linear combination of terms consisting of each variable multipled by its obtained optimum weight is the discriminant function.

The significance of the statistic, D^2, may be determined when all of the variables are considered as a group. However, it is also of interest to assess the contribution of each variable to the total discrimination. While there are many methods that can be used to obtain the D^2 statistic, the method which employs a pivotal condensation technique to reduce the variance-covariance matrix not only provides the value of D^2 between the groups but also provides the contribution that each variable makes to the total value. The pivotal condensation method involves a sequence of computations by which the effectiveness of an initially and arbitrarily selected variable is first determined. Effectiveness is judged by determining the distance between constellations of scores for the criterion groups created by the optimum weighting of this variable in the discriminant function and testing the distance value for significance. A second variable is then added to the first, a third to the first two and so on until all the variables have been combined in a prearranged sequence. After the addition of each new variable the distance value is again tested to determine whether it is significantly larger than zero, and whether the addition of the variable has increased the previously determined distance. The process of adding one variable at a time provides information about the contribution of each variable to multivariate description, but it should be noted that the order in which the variables are studied affects the results. There was no attempt to find the optimal combination of variables which would describe the groups. Because it was an initial step in multivariate description to be continued in later analyses, the solution of the multivariate problem for this study utilized an arbitrary ordering of the variables based on previous experience with the variables in question.

The discussion which follows presents the results of the sequential analysis of the data for persists in the four teacher education majors.

Generalized Distance Analysis

Tables 9.12 and 9.13 present the basic data from which the generalized distance values are computed. Table 9.12 presents the means of all the nine variables for each of the four majors, and Table 9.13 presents the variance-co-variance matrix for the four groups. To obtain the values given in Table 9.13, the variance and co-variance values are computed for each major separately and then pooled across the majors to obtain the values reported in the table.

Table 9.14 presents the results of the D^2 analysis in a sequential fashion. The distance (D^2) values between each pair of the four groups are first presented, (D_1^2) as based on only one variable, HSR. The asterisks indicate whether the distance separating each pair is statistically significant. The second set of six D^2 values (D_2^2) indicates the distance between the pairs of groups when two variables were the basis for the discrimination. In addition to the asterisks which indicate whether the two variables were effective in discriminating among the pairs, one additional test is indicated. The underline indicates whether the distance value has increased significantly by the addition of the second variable to the analysis. As each successive variable is added, a new set of six distance values is presented and the notation indicates whether the distance is significant and whether it is larger than the corresponding value in the previous set. With this general introduction to Table 9.14, the discussion turns to an interpretation of the analysis.

The first set of D^2 values (D_1^2) indicates that HSR provides effective distinction among all of the six pairs, for all D^2 values are significantly larger than zero. The most effective discrimination, as measured by the size of the D^2 value, was between Social Studies men and English, Speech, and Language Arts women, and the least effective between Math-Science men and Elementary women and between Math-Science men and Social Studies men. The addition of ACE to the analysis maintained a significant distance among all of the pairs and significantly increased the distance between four of the six pairs. The largest distances are found between the English, Speech, and Language Arts women and the other three groups.

Table 9.14

Distance (D^2) Values and Tests of Significance for the Generalized Distance Analysis of the Persists in the Elementary IA (1957-58), English, Language Arts-Speech, Social Studies, and Science-Mathematics Curriculums

		English (1)	Social Studies (2)	Math-Science (3)	Variables (4)
D^2_1					
Elementary	(1)	.30**	.35**	.09*	HSR
English	(2)		1.30**	.71**	
Social Studies	(3)			.09*	
D^2_2					
Elementary	(4)	.84**	.37**	.34**	HSR, ACE
English	(5)		1.65**	.76**	
Social Studies	(6)			.22**	
D^2_3					
Elementary	(7)	1.05*	.72*	.84*	HSR, ACE, MAT
English	(8)		1.67**	.83**	
Social Studies	(9)			.23*	
D^2_4					
Elementary	(10)	1.43**	1.05**	.84**	HSR, ACE, MAT, Reading
English	(11)		1.67**	1.25**	
Social Studies	(12)			.60**	
D^2_5					
Elementary	(13)	1.47**	1.40**	1.70**	HSR, ACE, MAT, Reading, MTAI
English	(14)		1.82**	1.79**	
Social Studies	(15)			.72**	
D^2_6					
Elementary	(1)	3.18**	3.05**	3.73**	HSR, ACE, MAT, Reading, MTAI, and Entry
English	(2)		1.83**	1.81**	
Social Studies	(3)			.74**	
D^2_7					
Elementary	(1)	3.20**	3.05**	3.81**	HSR, ACE, MAT, Reading, MTAI, Entry, and Age
English	(2)		1.86**	1.98**	
Social Studies	(3)			.79**	
D^2_8					
Elementary	(1)	3.32**	3.06**	3.82**	HSR, ACE, MAT, Reading, MTAI, Entry, Age, and High School
English	(2)		2.03**	2.05**	
Social Studies	(3)			.81**	

Table 9.14 con't

	English (1)	Social Studies (2)	Math-Science (3)	Variables (4)
D^2_9				
Elementary (1)	3.34**	3.06**	3.88**	HSR, ACE, MAT, Reading, MTAI, Entry, Age, High School and City
English (2)		2.04**	2.06**	
Social Studies (3)			.85**	

*D^2 value significant at .05 level
**D^2 value significant at .01 level

— additional variable adds significantly to D^2 value, .05 level
═ additional variable adds significantly to D^2 value, .01 level

The third set of figures, D_3^2, indicates that the addition of MAT significantly increases the distance between the Elementary women and the other three groups. The other three values did not increase. The D^2 values between Social Studies men and Math-Science men (.23) remained low. The addition of the Reading score further increases the distance between four of the six pairs. When the MTAI was added all but one of the distance values increased. The only distance which did not increase was the one between the two groups of women. The five psychometric variables in combination provided effective discrimination among the groups. Each variable when it was added contributed to the distinction between three to five of the pairs, indicating that each one was important in the solution.

The addition of the four remaining biographical variables presents a different picture. The addition of level of entry produced drastic increases in the distances between the Elementary women and the other three groups. This can be accounted for, however, by the different pattern of admission for elementary students that resulted from the College's program for these students. In view of this artifact, the variable does not provide meaningful distinctions between elementary and secondary curriculums. The remaining three biographical variables fail to add much to the distances provided by the five psychometric variables.

Considering the results of the discriminant analysis using the five psychometric variables, it may be concluded that the four groups studied are significantly different from one another. Knowing that these four groups have different psychometric characteristics is an important finding. It is confirming evidence for one of the basic assumptions of this study that states that studies of teacher education students should treat curriculum majors separately because they are not homogeneous as a result of their interest in education.

The fact that these majors could be classified on the basis of these multivariate data opens the way for further analyses in future studies. A cross validation of these findings is needed to determine how well the results will generalize to subsequent populations. It will also be important to perform similar analyses adding other teacher education majors.

Summary

This chapter compares the four curriculum groups studied in this project. The comparisons are made univariately for each of the biographical, psychometric, and academic variables on the entering groups as well as the persists and nonpersists. Multivariate comparisons are also presented through the report of analyses which used the generalized distance technique.

The univariate analyses showed significant and important differences among the groups studied. Only one of the variables, level of entry, failed to show significant differences and this variable appropriately compared only three of the four groups. In general the persists in the curriculums were found to differ among four groups in a pattern similar to the total group at the time of admission. The results for the nonpersist groups were not consistent. On some variables there were no differences among nonpersists groups, others showed significances similar to to those found among the persists, still other variables showed quite different patterns.

The multivariate analyses showed that nine of the variables could be weighted in linear combinations in such a way as to discriminate effectively among the four groups. This analysis provides evidence of the differences among curriculum majors which verifies an assumption upon which the project was originally built, in addition to providing additional descriptive data about the groups.

Chapter X

Conclusions and Implications

A Review of the Problem and the Approach

Graduates who are prepared to teach are the product of a sequence of individual and institutional decisions. This sequence of individual and college decisions; to apply, to admit, to enroll, to retain, to continue, to graduate, is the implementation of personal and institutional objectives. The individual decisions are those that are necessary if an individual believes he ought to teach. The institutional decisions are those made, by design or default, to define who may teach. These interrelated decisions, made by independent decision makers, characterize the process by which students come to be teachers, and this conceptualization underlies the approach of this research.

The problem as defined in this study was to describe students in one teacher education institution in such a way that factors related to the outcomes of individual and institutional decisions would be known. The principles that have guided this research state that factors which operate in the selective retention of students in teacher education can be studied effectively by making students the focus of the research. Such studies, however, need to consider separately the men and women in each of the several teaching fields over a span of time. A longitudinal view would make known the results of the sequence of decisions.

To study the results of individual and institutional decisions, this study has used the criterion of persistence. Students who began the first professional sequence of courses during three academic years were classified as "persists" or "nonpersists" at the end of three years. Persists were those who as a result of their own and the institution's decision continued in teacher education. Nonpersists were those who did not continue either by their own or the institution's decision. Of the 2388 students who were juniors in the College of Education over the period studied, 834 students from four curriculum groups were selected for detailed study. The following section summarizes the univariate and multivariate analyses of the psychometric, biographical, and academic data collected regarding these students by the Student Personnel Office of the College. The final section of the chapter presents the implications which the study has for several different aspects of teacher education.

Women in Elementary IA Curriculum

The analysis of the data for the three classes of junior women in the Elementary IA curriculum was presented in Chapter V in three sections which covered the biographical, psychometric, and achievement variables used in the study. Some of the general conclusions which could be drawn as a result of this analysis are discussed in the sections that follow.

Three Classes of Entering Juniors. Consideration of the biographical variables indicated that only one item successfully differentiated among the three classes. A significant relationship was found between the level of prior academic preparation and year of entry to the College of Education. Persons in the class of 1956-57 entered the College earlier in their college career than those in the class of 1957-58 or the class of 1958-59, while those in the 1957-58 group entered the College later than the other two classes and had completed more academic work before enrolling in the College of Education. While there is a suggestion of a trend over the three years for increasing numbers of students to enroll in the Elementary IA curriculum after having taken college work elsewhere, the evidence is slight and verification of such a trend will have to await the accumulation of more evidence. These data do suggest that fewer students are enrolling in the College directly from high school while the percent of students enrolling at the sophomore and junior level is nearly the same for all three classes.

The fact that the other biographical variables failed to differentiate between the three classes is of interest. The Elementary IA curriculum seems to be attracting people who, when considered as a group, are remarkably alike from year to year on the biographical variables. The three classes of junior women were similar in the type and size of high school attended, the size of the community in which the high school was located, and in the age at which they entered the junior year. Even though some exceptions do exist, the data presented in this study allows one to formulate a picture of the typical female student enrolled in this curriculum in terms of these biographical items. She lives in the urban metropolitan area, is the graduate of a large public high school, and enters the College of Education during the junior year at age 20 with a year or more of previous college work.

Although the three classes of Elementary women seemed to have similar biographical backgrounds, the analyses of the five psychometric variables did show some significant differences among the classes. The mean scores for the three classes indicated that the 1956-57 group of junior women scored higher on all variables, HSR excepted, than the other two classes, though small differences were also noted between the other two groups. The 1957-58 class was the most variable of the three groups while the 1958-59 group showed the least variability. It is of interest that the 1956-57 class was the one, as a group, that entered the College of Education earliest in their academic careers and had the least amount of prior college education when compared with the other two groups, yet this group consistently exhibited a higher mean score on four of the five psychometric variables considered.

The combined frequency distribution of High School Rank showed that in general, the women in the Elementary curriculum achieved well above the average in their high school. When compared to the norm groups composed of entering college students at the University of Minnesota, these women were about average in their performance on measures of scholastic aptitude. They scored somewhat below average on the MTAI compared with entering juniors. The mean scores on the MTAI showed a marked and consistent decrease for each succeeding class.

In order to obtain more information relating to these psychometric variables for use in this and future studies, the intercorrelations among the variables for each year were computed. The intercorrelations between the measures of scholastic aptitude, the ACE, MAT, and Coop Reading were of the order of .60. Intercorrelations between HSR and ACE, MAT and Coop Reading were about .35. Correlations between the MTAI and the other four variables (HSR, ACE, MAT, and Coop Reading) varied around .15. These intercorrelations were different from those found in many other investigations which have dealt with these same variables. This may, in part, be accounted for by the fact that this group was composed of juniors in college and the possible range of scores on these variables has been curtailed due to the selection of students that occurs during the first two years of college. The question of whether the relationship between the five variables was larger than could be expected by chance was investigated, and the results showed that all correlations were significant.

In short, the class of 1956-57 accounted for most of the demonstrated difference between means on the psychometric variables. The class of 1957-58 showed the most variability on these data. The class of 1957-58 also showed higher correlations among these variables than did the other two groups.

Only one academic variable, transfer GPA, was used to describe the three classes of Elementary women as they entered the College of Education. These data showed that among those who came with previous college work, there were no differences among the three classes in their mean transfer GPA.

In summary, only one of the biographical variables differentiated between the three classes of Elementary women. The academic variables considered showed no differences between the classes. There were statistically significant variations among the three classes with respect to the psychometric variables used in the study, but these differences seem to be of small practical significance. It is believed that the analysis of future classes will show that some variations from year to year are to be expected. In view of these comparisons it did not seem unreasonable to pool the students enrolled during the three years for a comparative investigation of persists and nonpersists.

Persists and Nonpersists Compared. Comparisons of persists and nonpersists on each of the five biographical variables were made in two ways: considering the three classes separately and considering the three classes combined. No relationship was found between persistence and the school of prior registration for the 1956-57 class or for the 1958-59 class. Within the 1957-58 class, however, there was a tendency for persists and nonpersists to come from a particular kind of school, and this relationship was strong enough that the same pattern of results held when the three classes were considered together. The analysis showed that in the class of 1957-58 students coming from colleges outside the University were classified as nonpersists more than twice as often as for the other two classes. Persistence was found to be independent of the number of credits at entry when the three classes were considered separately. When the three classes were considered together, however, the results showed that a larger proportion of nonpersists, particularly in the 1957-58 class, entered at the junior and senior levels.

None of the differences between the proportion of persists and nonpersists who come from the various categories of size and type of high school were significant when classes were considered separately or simultaneously. The same findings prevailed when the relationship between size of community and persistence was investigated.

The data showed that age and persistence were unrelated for two of the classes but the class of 1958-59 had a disproportionately large number of older students who were nonpersists. When age, year of entry, and persistence were considered together the relationship was also significant but no consistent pattern between age and persistence over the years was evident.

The results of the analysis of biographical data can be summarized by noting that the application of the criterion of persistence to the three classes produced little information that would be helpful in characterizing those who persist except as these data could be used to describe year by year variations. No consistent pattern was apparent for the classes studied separately and no biographical differences appeared when the criterion groups were combined. The most inclusive statement that could be made is that the differences that were noted were due to disproportionalities in the nonpersist groups and these most often came from the 1957-58 class.

Psychometric data for persists and nonpersists were examined in two ways: (1) within class comparisons of persists with nonpersists, and (2) across the class comparisons of each group separately. Results showed no significant differences between persists and nonpersists within the 1956-57 or the 1958-59 classes. Significant differences were shown to exist within the 1957-58 class on three of the five psychometric variables, HSR, ACE, and MAT, and in all cases the means of the persists were higher than those of the nonpersists.

Comparisons across the classes on psychometric variables indicated that the mean scores of the persists in the three classes differed on four of the five measures. The only difference that failed to reach statistical significance was HSR, though this difference was in the same direction as the other differences; in favor of the persists. The significant mean differences for persists on the other four psychometric variables could be attributed to the high means on the variables in the 1956-57 class. The mean scores of the nonpersists did not differ from class to class. The failure of the nonpersists'means differences to reach a significant level, however, may be due to the small number of nonpersists. No systematic differences in the intercorrelations among the psychometric variables were found for persists nor were any found for the nonpersists, but correlations greater than zero did occur consistently.

To sum up the results for the psychometric data with reference to the criterion of persistence, the differences among the three classes could largely be accounted for by differences among the persist groups. These differences were not all shown to be significant, but they were of sufficient size to suggest that a more detailed examination of the criterion groups would be of value. The nonpersists tended to exhibit larger variances. The intercorrelations presented no systematic pattern of differences across the class but were of sufficient size to warrant further study.

Three academic variables, two grade point averages and one probationary status variable, were used to make comparisons between the persists and nonpersists within and across the three classes of junior women. Results indicated that the mean Ed 75 GPA and the overall GPA were not different among the three classes either for persists or nonpersists. Within the three classes the academic data as reflected in the Ed 75 GPA and the overall GPA indicated that the persists achieved better than the nonpersists. Examination of the two groups showed significant differences only in the overall GPA variances of the nonpersists. The number of persons in each criterion group who had been on academic probation at some time was examined for each class. The results showed that probationary status was related to the criterion of persistence. It was also noted that the percentage of persons on probation consistently increased from year to year, regardless of whether they were persists or nonpersists, though this may in part be attributed to a change in grading policy in the College.

The persists exhibited higher grade point averages than nonpersists both in their professional course and college work. Also, more nonpersists than persists had some history of probation. The pattern of relationships between persists and nonpersists seemed to suggest that further analysis would be profitable. Accordingly, a multivariate description of the criterion groups, using all the biographical, psychometric, and academic variables simultaneously, was performed. The problem was one of finding whether or not the variables available could be used to differentiate between the criterion groups, the persists and the nonpersists. Six separate analyses were made, two for each of the three junior classes. One analysis for each class used the data available at the time they entered the junior year and one, the data available at the termination of the study. Results showed that the persists in the 1957-58 class and the 1958-59 class were successfully differentiated from nonpersists using the "at entry" variables. However, there was no marked consistency in the variables which did differentiate between persists and nonpersists in these two classes. For both of these groups the MAT was the most heavily weighted variable. For the two significant analyses, those variables which came from the junior test battery used by the College of Education were the most heavily weighted ones. In all three analyses, the biographical items were least effective.

The analyses of the data using the twelve "at term" variables, entry data plus academic data, showed significant results for all three classes. Again, there was almost no consistent pattern of discrimination. Discrimination weights which were low in one class were high in another. In general, the three academic variables, probationary history, overall GPA, and Ed 75 GPA were more heavily weighted than the nine other variables. The variables relating to high school background were weighted quite low in all classes.

It may be concluded that the variables used in this study were effective in discriminating between persists and nonpersists for the three classes of Elementary women studied. However, since no identifiable pattern of weighting developed over these three years, generalizations of these results to other groups must be made cautiously and definite conclusions about how useful these variables are in classifying persists and nonpersists will depend on future study.

Women in English, Speech, and Language Arts Programs

Because of the small number of students enrolled in curriculums other than Elementary Education, it was necessary to combine some major groups and combine the three junior classes to provide reasonable sample sizes. The first grouping thus considered includes women who majored in English, Speech, and Language Arts curriculums during the three years.

Descriptive data concerning the biographical variables used in this study showed that most (over three-fourths) of this group transferred to the College of Education from another college on the campus of the University of Minnesota. In terms of prior preparation, nearly seven out of eight of the women in these curriculums entered the College at the junior level, though a few persons entered at the senior level.

Biographical data relating to the size and type of high school attended by the group of women indicated that most of the women came either from the large public high schools located in urban areas such as Minneapolis, St. Paul, or Duluth, or from small public high schools located throughout the state. Few came from suburban communities or larger cities.

When the distribution of ages was examined, the majority of women in these majors were the same age as the typical college junior. It was noted, however, that a number of these women were older than 26, a fact which represents a significant deviation from the typical age pattern of college juniors.

The psychometric data for women in the English, Speech, and Language Arts majors showed that these women were, on the average, in the upper fifteen percent of their high school classes in achievement. They also scored high on the three measures of scholastic aptitude when compared with the norms used for entering College of Education juniors. The mean MTAI score for this group, however, was well below the mean score for the norm group. The data showed that very few of these women had ever been on probation.

The attempt to differentiate between persists and nonpersists in these three majors using the five biographical variables produced no significant differences. However, some trends were noted. More nonpersists came from off campus than from on campus, though in general persistence was not related to school of prior registration. More seniors than juniors were classified as nonpersists, but the relationship was not significant. Twice as many nonpersists came from small high schools as from large public high schools, and persons who came from large urban public high schools had a higher rate of persistence than persons who came from larger cities outside the metropolitan area.

The observed relationship between age and persistence was higher than than between the other biographical variables and persistence. Older or younger persons seemed less likely to persist, but the relationship again failed to reach a level of statistical significance.

Four of the ten comparisons that dealt with the psychometric data revealed significant differences between the criterion groups. Three of these differences showed persists scoring significantly higher than nonpersists on HSR, ACE and MAT. The fourth difference noted involved the variance of the distribution of HSR. On this variable the persists had a significantly smaller variance than the nonpersists.

In general, the psychometric data indicated that the persists were the higher achievers in high school, and performed better than nonpersists on the measures of scholastic aptitude in this study. The pattern of intercorrelations on these data revealed no consistent pattern of difference between the criterion groups.

Relative to the academic variables used in this study, the persists had a significantly higher overall GPA but the differences in the Ed 55 GPA failed to reach a significant level. This, in part, was attributed to the significantly larger variance for the persists on this variable. A comparison of the probationary history of the women in this group revealed no differences between the criterion groups. Thus, the academic data for this group indicates that, though nonpersists are not placed on probation more often than persists, they do not do as well as persists on overall academic achievement.

The multivariate analysis, again conducted in two phases as with the Elementary group, showed that neither the nine "at entry" variables nor the twelve "at term" variables were effective in differentiating between persists and nonpersists. It seems that the most inclusive statement that can be made about the criterion groups in these majors is that the persons who did not complete their program were very similar to those who did complete the program on all variables except the psychometric ones.

Men in the Social Studies

The Social Studies curriculum included in this study included all those men admitted to the College of Education as majors in one of the social sciences and who enrolled for the professional sequence during the three years 1956-59. Since the number of men in this curriculum was not large enough to allow a year-by-year analysis, the three classes were combined.

Biographical, psychometric, and academic variables were used to obtain descriptive information about this group of men. Data concerning the school of prior registration and level of prior preparation indicated that the majority of them came from a college on the campus of the University of Minnesota. Even though the majority transferred to Education at the junior level, a sizable proportion of them entered the curriculum with sufficient transfer credits to be at the senior level. The distribution of ages for this group also points up the fact that a significant number entered the program later than is typical for other curriculums. Nearly one-third of the group was over twenty-three years of age, which makes them older than the typical college junior. Most of the group attended large public high schools and the second largest group of them came from small schools with enrollments of less than 100 in the top six grades. Very few of them came from private schools. Over half these men came from urban backgrounds, very few from suburban areas.

Investigation of the distribution of scores on the psychometric variables showed that the men in the Social Studies curriculum stand in the upper third of their high school classes. They scored very much like College of Education juniors in general, as far as the measures of scholastic aptitude and reading comprehension were concerned. They were decidedly different from College of Education students when the MTAI scores were studied, falling at about the fifteenth percentile of the norm group. Data on the probationary history showed that few of these people had ever been on academic probation.

When the criterion of persistence was applied to the group and biographical differences were examined, none of the comparisons were significant. The rate of persistence was somewhat higher for those who transferred from colleges outside the University than from within the University, and the rate was higher for those entering at the junior rather than the senior level, but neither of these differences was significant. There was no demonstratable relationship between persistence and high school or community backgrounds, though there was a tendency for those from small public high schools to persist. There was also a tendency for those from small rather than large communities to persist. There was no relationship, demonstrated or even suggested, between age and persistence.

Comparisons of the means and variances of persists and nonpersists for the five psychometric variables showed no differences that were significant. All but five of the intercorrelations for the psychometric data were different from zero, but none of them showed a significant difference between persists and nonpersists. It was of interest to note that the correlations between HSR and MAT and between HSR and Reading scores for the nonpersist group were no larger than could have been expected by chance. These results are contrary to those usually found between these variables.

It was possible to show a significant mean difference between persists and nonpersists on both overall GPA and Ed 55 GPA, though no difference was noted in the variances. Probationary status was found to be independent of persistence for the group of men.

In summary, the persists and nonpersists in the Social Studies curriculum were notably similar on biographical and psychometric variables. For all practical purposes they may be regarded as belonging to the same population as far as these data were concerned. The only demonstrated differences occurred in the academic GPA's and this difference might have been expected.

The multivariate analysis of the data was conducted for the Social Studies men as with the other groups, to discover whether or not combinations of biographical, psychometric, and academic variables could be used to differentiate between the criterion groups. The nine "at entry" and the twelve "at term" variables were used. The results using the nine variables failed to reach the chosen level of significance, but it was so close to the critical value that examination of the assigned weights seemed necessary. For this group, reading scores and age were most heavily weighted, with HSR and high school community next in order, a different pattern from the one noted with the two previous groups.

The analysis of the twelve "at term" variables resulted in non-significance. The discrimination between the criterion groups was less effective when the three additional academic variables were added. Though the variables were still weighted in the same order, the additional variables only diluted the separation instead of making it more distinct.

Thus, for practical purposes, it was not possible to distinguish between persists and nonpersists in the Social Studies curriculum using admissions data; neither was it possible to do so using data available at the end of the study.

Men in the Mathematics-Science Curriculums

The three majors, Mathematics, Natural Science, and Physical Science, did not contain enough persons to allow separate analyses for each curriculum.

Since preliminary analyses showed no clear-cut patterns of differences on admissions data among the three majors, they were treated as a Math-Science combination and only males were considered.

The biographical variables revealed that almost without exception these men transferred to the College of Education from another unit within the University of Minnesota. Nearly all of them entered Education at the junior level, with very few entering at the senior level. The data on high school and community background showed that they came almost entirely from public high schools. They were divided almost evenly between those who came from urban communities and those from communities of less than 10,000. A negligible number came from suburban areas.

The age distribution of these men presented a somewhat different picture from that usually found. The majority of the group were either older or younger than the typical college junior. Nearly half of them were twenty-three or more years old.

Academically, these men were in the top quarter of their high school classes, and on the psychometric measures of scholastic aptitude they also performed above average for College of Education norm groups. They performed below average in the reading tests and were definitely below average on the MTAI, falling in the lowest decile of the norm group on this latter measure.

The proportion of these men who were on academic probation at some time during the years studied was quite high, over one-fourth of the group being so classified.

When the criterion of persistence was applied to the group of Math-Science majors, the comparisons using the biographical data showed no significant differences between persists and nonpersists. The rate of persistence was about the same for those who came from off campus as for those who came from on campus. The same situation prevailed for those who entered at the junior level or the senior level. No significant relationship was found between persistence and type high school or community backgrounds. However, it was noted that graduates of small high schools were more likely to persist than graduates of large high schools located in urban or suburban areas. Although the frequencies in the various age categories were small, the highest rates of persistence were found in the older age groups. The relationship between age and persistence, however, was not significant.

Upon examination of the mean scores of persists and nonpersists on the five psychometric variables, it was found that only one comparison resulted in a statistically significant difference. The mean reading score for nonpersists was higher than the mean reading score for persists. As a matter of fact, all of the mean values for nonpersists were higher than the mean values for persists, though they were not larger than could have been expected by chance, except for the reading score. On three of the five measures, nonpersists had larger variances than persists. None of the intercorrelations indicated differences between persists and nonpersists, and all correlations were within the range of values normally found in studies using these variables.

The performance of the two criterion groups on the academic variables, overall GPA and Ed 55 GPA, did not differ significantly, but the two groups did differ on probation data. Of all those who were on probation at some time during their college career, more of the total were persists than were nonpersists. More of the nonpersists, however, were on probation than were not on probation.

Thus, consideration of the available data in univariate analyses showed only one significant difference between the criterion groups. It was noteworthy that this one difference was in favor of the nonpersists. Whether the single difference is an artifact of the particular group studied remains to be seen. However, it seems reasonable to assume at this point that, in terms of the univariate data, persists and nonpersists do not differ.

The two multivariate analyses were conducted for this group in the same manner as for the other groups studied. Results showed that it was not possible to distinguish persists from nonpersists using the nine "at entry" variables. Different results were shown when the three variables measuring performance in the College of Education were added. The twelve "at term" variables did successfully discriminate between the criterion groups. The variables which contributed most to this discrimination were probation and Ed 55 GPA, though overall GPA also contributed to the separation. It was noted that HSR still maintained a prominent position in the order of weightings as it had in the analyses for the other curriculum majors.

The Four Curriculums Compared

The data analyzed in chapter nine presents the results of an attempt to discover whether or not there are important and identifiable differences between students in the various teacher education curriculums. Univariate and multivariate comparisons were made to detect differences on biographical, psychometric, and academic variables for the students who entered the four curriculums, and also to detect differences on these variables between the two criterion groups; persists and nonpersists.

Univariate comparisons among the four curriculums were made in three parts for each of the variables. The first comparison used the data available at the time of entrance to the College of Education. The second compared the persists, and the third compared the nonpersists. One multivariate comparison was made to answer the question of whether or not it was possible to differentiate among the persists on the basis of data available at the time of admission to the College.

The comparison of the four curriculum groups by school of prior registration indicated a significant relationship among the groups at the time of admission. The relationship was due to the large percent of the women in the English, Speech, and Language Arts curriculum who came from off campus and the very small percent of the men in the Math-Science curriculum who came from off campus. A significant relationship was also found when persists in the four groups were compared on school of prior registration. In fact, the division of the curriculums into persists and nonpersists gave a stronger relationship between curriculum major and school of prior registration for the persists than for the total groups. There was no relationship between the four groups and school of prior registration for the nonpersists.

The four-year Elementary curriculum was omitted and only the three two-year curriculums studied were included in the comparisons of major and the level of prior academic preparation. Results showed no relationship between the curriculum and the level at which the students entered the degree program, regardless of whether the comparison was made at the time of entry to the program or with persists or nonpersists. There was no tendency for students in any major to be admitted at a particular point in their academic careers.

Three significant relationships were found when the four curriculums were compared as to the size and type of high school attended. Of the total who entered the four curriculums, the English, Speech, and Language Arts women and the Math-Science men more often attended small public high schools. Persists in these two curriculums were most often graduates of small public high schools while persists in the Elementary program were most often from large public high schools. In the third comparison of nonpersists, no differences were found. Thus, the four groups, when considered at the time of entry or as persists, did not graduate from the same kind of high school.

Three of the majors, Elementary, English, and Math-Science, contributed most to the significant relationship found between the four curriculums and the size of the high school community. These majors differed from each other in that more of the English and Math majors came from schools located in communities of less than 10,000 while this was not true for Elementary women. This same pattern of differences contributed to the significant relationship found among persists. For the nonpersists, however, there was no relationship found between major and size of high school community.

Data on the age variable also indicated a significant difference among the four curriculums. More Social Studies and Math-Science men were in the older age categories, while Elementary women were more often in the younger ages. This same pattern of differences was observed when persists and nonpersists were compared on the age variable.

To summarize the univariate biographical data briefly, a significant relationship was found among the majors at the time of entrance into the College of Education when school of prior preparation, size and type of high school attended, size of high school community, and age variables were considered. Persists were found to differ on the same variables. Nonpersists differed on size and type of high school and age variables. Many of these relationships were different when the variables were compared among majors than when the same variables were compared within a major. The strength of the relationships found was generally increased when the criterion of persistence was applied to the four curriculum majors.

Comparisons among the four curriculums on the five psychometric variables showed a consistent pattern of significant differences on all variables. Considering the groups at the time of entry to the College, women in the English, Speech, and Language Arts curriculum maintained the highest mean score on all of these tests except the MTAI. Social Studies men exhibited the lowest mean HSR, and Elementary women had the lowest ACE, MAT, and Reading scores. Math-Science men had the lowest MTAI scores. This same pattern was repeated among the persists. Nonpersists showed differences on only three variables, but the above pattern of differences was again apparent.

As indicated by the variances, the entering groups had different distributions of HSR. On this variable, the English, Speech, and Language Arts women were remarkably homogeneous when compared to the other groups. Data for the persists for the four curriculums showed these same results. No differences were found among nonpersists for the four groups.

All intercorrelations among the variables were different from zero. Three correlations were shown to be different among the curriculums studied, four were different when persists were studied, and two were different for nonpersists. When persists were compared, it was of considerable interest to find that the correlation between HSR, a measure of high school achievement, and ACE, a measure of high school ability, was highest for Math-Science men and lowest for English, Speech, and Language Arts women. The overall effect of applying the criterion of persistence to the four groups was to reduce the variability in the intercorrelations among the psychometric variables.

Comparisons using the academic data were made only between persists and nonpersists. Significant differences were found among the four majors in measures of grade point average. Among the persists, English, Speech, and Language Arts majors showed the highest overall GPA mean and the highest mean GPA in the first professional course. Elementary women showed the lowest mean on these variables. Differences in mean GPA's were also found among the nonpersists. Social Studies men had the highest GPA and Math-Science men the lowest. Nonpersists among both Elementary women and Math-Science men achieved lowest in their first professional course.

The probationary history of these students indicated that probationary status and curriculum major were related rather than independent. Among the persists, very few English, Speech and Language Arts women had ever been on probation, whereas about one-fifth of the Math-Science men had been on probation during the time they were enrolled in the College of Education. Considering the four majors, nearly one-third of the nonpersists had been on probation. This percentage varied among majors with few of the nonpersist English, Speech, and Language Arts women ever on probation while nearly two-thirds of the Math-Science nonpersists were on probation at some time.

To summarize the academic data, English, Speech, and Language Arts women had higher achievement records than the other majors and were least likely to be on probation, whether they were persists or nonpersists. Social Studies men achieved almost as well as the English women, and were seldom on probation either as persists or nonpersists. Thus persists and nonpersists in these two majors were quite similar. Persists and nonpersists in the Elementary and Math-Science curriculums were quite different. In both of these majors, nonpersists achieved well below average and the proportion of people who were on probation was quite different for both persists and nonpersists. One can conclude that the pattern of academic data among these four majors was quite different.

The multivariate comparisons among these majors were limited only to comparisons of persists at the time they entered the College of Education. Other comparisons were possible, but the question asked was whether or not persists in the four majors were different at the time of admission. Phrased another way, are the products (those who persist) of the four curriculums different as measured by variables available at the time of admission?

Results of the multivariate analysis indicated that HSR successfully differentiated among all of the six possible pairs of the four curriculums. Addition of the ACE scores maintained the separation between all pairs of majors and increased the distance between four pairs. Addition of MAT scores increased the distance between Elementary women and the other three groups and Reading scores further increased separations. MTAI scores increased all distances but one. One can conclude that the five psychometric variables successfully differentiated among the groups.

The multivariate analysis revealed that the four groups studied are significantly different from one another. These results confirm one basic assumption of this study, namely, that there are important differences between students with various teacher education majors. These additional descriptive data about the groups also provide a basis for future analysis of these and other teacher education majors.

Summary

How, then, in summary, can the major question which has guided this study be answered? Are there identifiable factors that are operative in the selective retention of students in teacher education? The question is simple and direct, but the answer is more complex and qualified. Nevertheless the answer is yes, there are identifiable factors, even though their interpretation is not straightforward. The findings are summarized in the following statements.

(1) The most definitive finding was the substantiation of a basic underlying assumption of the research. There are significant and important differences among students in different teacher education curriculums. Students in the different curriculums studied showed both univariate and multivariate differences on biographical, psychometric, and academic variables. A second fundamental assumption concerning the sex differences of students in the same curriculum could not be tested because of inadequate sample sizes, but this assumption will be tested in Part II of the study.

(2) In one curriculum studied, Elementary women, the data were examined for year-by-year consistency and some differences were noted among the three junior classes. Such differences were not judged sufficient to override the major similarities of students entering in the three years studied or to invalidate the longitudinal approach to questions posed in this study.

(3) Some differences, both univariate and multivariate, were found between the criterion groups studied, the persists and the nonpersists. These differences, however, were such that no single variable nor pattern of variables could be found that would consistently distinguish persists from nonpersists.

(4) The academic variables, overall, were the variables that were the most effective in describing the differences between persists and nonpersists. Academic performance was the most effective indication of whether students would continue in teacher education.

The results of this study, with its limitations considered, do have significant implications for teacher education, and these are presented in the following sections.

Implications

The framework for this research suggested that studies of teacher education can appropriately begin by studying students. In this final section of the report the purpose is to present the implications of the approach which this research has taken, as well as its results. The fact that this study is the first phase of the projected long-term study increases the significance of the implications. The study was begun knowing full well that in the long run the most important contribution of these early years would be to establish the data gathering procedures and initiate the study of a sample of students in teacher education. This is not to suggest that the analyses are not important. Indeed, they are essential in evaluating the validity of the approach which has been taken, as well as to set the course for future, more complete, analyses. The implications are discussed under five separate headings which follow. The first two sections explore the implications for institutional and individual decisions, and the third concerns the teacher education curriculum. The fourth part deals with the implications for knowledge of vocational development, and the final section looks at the suggestions for further research.

Institutional Decisions

The data gathering function is one of the important contributions which a student personnel program can make to an institutional decision making process. The system of student personnel records which was initiated as a part of this research project has important implications for an institution's decision making procedures. Faculty and administration who must make decisions in behalf of the institution soon find, as we have found since the beginning of our research project, that data, accurate, complete, and up-to-date, are indispensible. An example will illustrate the point. Early in this study the College of Education undertook a study of its admission threshold for *freshmen. Of particular concern were those entering the Elementary Education* curriculum as freshmen. Student personnel records were assembled which related student retention rates to admissions data. It is fair to say that data, largely from this project, made available to study the question of admission to four year curriculums had a significant influence on the decision making procedures. Since data by themselves cannot determine a decision, it is not reasonable to infer that the data determined the resulting change of admission policies for students in Elementary Education, but they did, indeed, provide relevant information important to the process.

The data presented in this report have implications for the current decision making strategy of the College of Education. The analyses provide descriptions of juniors admitted to the curriculums in the College and describe retention rates in these curriculums. Although the numbers of students who are retained do vary from curriculum to curriculum, the number is in general quite high. Of those admitted to the junior year, 85% to 90% persist in their curriculums which implies that current admission policies affecting juniors are reasonable and appropriate to maintaining a high retention rate. This implication is further supported by the fact that the most consistent indication of differences between persists and nonpersists is their academic performance after being admitted into the College, rather than their scores on the battery of tests which were a part of their admissions procedures.

Data from this study do point up one important deficiency in the evaluation of student performance. Although there are grade point average data which give some indication of the level of performance of students in the various curriculums, these do not provide data for a direct comparison among students in the different teaching majors, because different curriculums require different courses. In addition there is no way to make direct comparisons between students in different major fields who have taken work in any one area--science, for example--for these students have not taken the same courses in this area. The need for additional achievement data from a uniform testing program for all students was recognized quite early, and became an essential feature of the second phase of this study, now in progress.

Individual Decisions

The importance of the individual student's decisions in producing a graduate certified to teach has been discussed previously. Decisions to apply, to enroll, and to continue are necessary for students who feel that they ought to teach. Though this study was not formulated or conducted primarily to assist individuals with these decisions, the results are relevant for them because the institution's policies for decision making are contingent conditions for individual decisions. In addition, assisting students with their individual decisions was recognized as an important function of student personnel work in teacher education.

One of the most important ways that student personnel workers can assist in individual decision making is by providing information for the student that is revelant to his pending decision. Recent work in social psychology has inferred that individuals need to compare themselves with others whose performance is relevant for an evaluation of their own behavior. Applicants for teacher education need to know what students in the College of Education are like; they need to know how they compare with these students. In thinking about whether or not they want to be teachers, students need to know what kinds of people teachers in general are; what they are like; and how they compare with them. Information from this study makes an important beginning in providing a description of students in teacher education and the differences that are found among those enrolled in the various curriculums.

Curriculum Implications

Descriptions of students have an important part to play in the evaluation of teacher education curriculums because the payoff for a professional curriculum is the performance of its graduates. The initial descriptions which are published in this report provide an opportunity for teacher educators in the curriculum areas described to look more closely at the students who persist in their curriculums and those who do not. Certainly the evaluation of the effectiveness of a curriculum ought to contain an accurate description of the students who are involved. With these data, and those which will come in subsequent projects, those faculty who are responsible for a curriculum in the various teaching fields will have available descriptions of their students which will be important information in the evaluation of their curriculum outcomes.

Vocational Development

From a different point of view than thus far presented it would be appropriate to characterize this research as an effort to provide information on the psychology of becoming a teacher. Research in recent years has suggested that the process of choosing, studying for, and entering upon a field of work must be understood as a continuous, developmental process rather than as an occupational choice made at a particular moment in time. Data in this study showed that students in different teaching majors made their decision to enter the professional program at different ages. It may be that the decision to prepare for teaching as an occupation comes at different points for students in different major fields. Certainly, one of the more practical implications of understanding the vocational development of teachers applies to the problem of recruitment. If additional students are to be recruited for teacher education, at what point will recruitment efforts be most fruitful?

Probably the most important implication for the study of vocational development lies in the fact that this study has established a population base for observing the professional development of those who entered the College of Education. In addition to knowing how individuals decide to become teachers, a great deal more needs to be known about the subsequent professional development of those who complete teacher education. It will be important to know which graduates teach, become principals, counselors, other education specialists, and which leave the field. Data from this study and its continuation in subsequent years can provide a longitudinal record of this individual vocational development. Many studies of individuals who become educational administrators or other educational specialists have had resort to an "autopsy" approach in which the investigators dissect the life history to try to identify the factors which have influenced their occupational decisions. Longitudinal research can trace the professional development of students who began in the College of Education so that descriptions about their professional development can be accurately constructed.

Future Research

Probably the most significant implication for further research is the need to continue the procedures which have been established and to extend data that have been gathered for the initial populations of students. The need to study other curriculum groups for which numbers were insufficient in this study is certainly evident. In addition, new information should be incorporated and additional comparisons need to be made in future studies. The need for additional standardized achievement data was noted previously. The results here indicate the need to move to a more microscopic type of analysis. This study implies that the likelihood is small that further analysis of persists versus nonpersists will be fruitful. The approach thus far has been helpful and the descriptions that have been provided are useful, but the analyses suggest that a finer focus is required. Since the writing of this report overlaps with the conduct of the second phase of the longitudinal research, it should be noted that some of these implications are an important aspect of part II of this study.

A most important implication for further research lies some years in the future. With data on such a sizable number of teacher education students and with the follow-up processes which have already been begun, there will be opportunities to study these students at various points in their post-college years. A periodic follow-up of graduates would provide information about the professional development of teachers which is not currently available. Such data would have implication not only for the education of teachers, but for the teacher personnel work of the public schools.

Further research ought to include a detailed analysis of the classroom performance of graduates in the various teacher education curriculums. The performance analyses could then be related to admissions data and to student's achievement in the College of Education. Such analyses would provide important information concerning the relation of performance in undergraduate teacher education to subsequent performance in the classroom.

In future years studies of the type reported here and proposed in the implications could profitably include more than a single institution. Cooperative projects in the description of teacher education students with graduates from several institutions of different sizes and types could provide valuable comparative data that are not now available. Since this project has begun there has been an interest on the part of a number of teacher education institutions in making similar studies of their own students. There was sufficient interest in this type of research among colleges of education in the Big Ten and the University of Chicago that the College of Education was invited to hold a conference at the University of Minnesota. At this conference the research project reported here was outlined and such data as were available and their implications were discussed with the participants. When the possibilities for inter-institutional cooperation were explored a number of institutional representatives indicated a definite interest. Clearly, a future step for this type of descriptive research is to move to cooperative studies with other institutions..

Summary

It is not unusual in educational research to find more implications than conclusions. It is particularly true in this study where the purpose was to begin a longitudinal study of students in teacher education and their subsequent professional activities. We believe that this study has made important beginnings and that subsequent research studies will show the fruits of this longitudinal approach.

APPENDIX

The Status and Level Completed at the Close of Spring Quarter, 1959, of Three Entering Junior Classes of Men and Women in the Elementary IA Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	23				14				1				38			
Complete Jr.	1		1		14		2	2	20				35		3	2
Complete Soph.			1			1	2	1	16		1	3	16	1	4	4
N	24		2		28	1	4	3	37		1	3	89	1	7	6
				26				36				41				103
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	186				120				1				307			
Complete Jr.	3		10	2	58	2	11	6	120		2	1	181	2	23	9
Complete Soph.		1	8	1	3	1	12	2	61		9	5	64	2	29	8
N	189	1	18	3	181	3	23	8	182		11	6	552	4	52	17
				211				215				199				625
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	209				134				2				345			
Complete Jr.	4		11	2	72	2	13	8	140		2	1	216	2	26	11
Complete Soph.		1	9	1	3	2	14	3	77		10	8	80	3	33	12
N	213	1	20	3	209	4	27	11	219		12	9	641	5	59	23
				237				251				240				728

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Elementary IIA Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	1												1			
Complete Jr.			1						1				1		1	
Complete Soph.																
N	1		1	2					1			1	2		1	3
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	13				3				1				17			
Complete Jr.	1		4		4		5		8			1	13		9	1
Complete Soph.			1		1		3		2				3		4	
N	14		5	19	8		8	16	11			1 12	33		13	1 47
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	14				3				1				18			
Complete Jr.	1		5		4		5		9			1	14		10	1
Complete Soph.			1		1		3		2				3		4	
N	15		6	21	8		8	16	12			1 13	35		14	1 50

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Elementary IIIA Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	2				5				3				10			
Complete Jr.									3				3			
Complete Soph.			1					1	1		1		1		2	1
N	2		1		5			1	7		1		14		2	1
				3				6				8				17
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	21				18				16				55			
Complete Jr.			1		2		3		8		2		10		6	
Complete Soph.			2		1		2		4				5		4	
N	21		3		21		5		28		2		70		10	
				24				26				30				80
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	23				23				19				65			
Complete Jr.			1		2		3		11		2		13		6	
Complete Soph.			3		1		2	1	5		1		6		6	1
N	23		4		26		5	1	35		3		84		12	1
				27				32				38				97

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Elementary IB Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate									1				1			
Complete Jr.									1				1			
Complete Soph.																
N									2				2			
				-				-				2				2
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	51				38								89			
Complete Jr.			3		8		6	2	27			1	35		9	3
Complete Soph.							1		10		1	1	10		2	1
N	51		3		46		7	2	37		1	2	134		11	4
				54				55				40				149
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	51				38				1				90			
Complete Jr.			3		8		6	2	28			1	36		9	3
Complete Soph.							1		10		1	1	10		2	1
N	51		3		46		7	2	39		1	2	136		11	4
				54				55				42				151

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Women in the Elementary IIB Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate																
Complete Jr.																
Complete Soph.																
N				-				-				-				-
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	1												1			
Complete Jr.				1			1								1	
Complete Soph.									1		1		1		1	1
N	1			1 2			1	1	1		1	2	2		2	1 5
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	1												1			
Complete Jr.				1			1								1	
Complete Soph.									1		1		1		1	1
N	1			1 2			1	1	1		1	2	2		2	1 5

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Women in the Elementary IIIB Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate																
Complete Jr.																
Complete Soph.																
N				-				-				-				-
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	3				8				1				12			
Complete Jr.					1		1		1				2		1	
Complete Soph.			2								1				3	
N	3		2		9		1		2		1		14		4	
				5				10				3				18
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	3				8				1				12			
Complete Jr.					1		1		1				2		1	
Complete Soph.			2								1				3	
N	3		2		9		1		2		1		14		4	
				5				10				3				18

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Core Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	8												8			
Complete Jr.			2						1				1		2	
Complete Soph.							1								1	
N	8		2	10			1	1	1			1	9		3	12
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	5				1								6			
Complete Jr.			1				2								3	
Complete Soph.																
N	5		1	6	1		2	3				-	6		3	9
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	13				1								14			
Complete Jr.			3				2		1				1		5	
Complete Soph.							1								1	
N	13		3	16	1		3	4	1			1	15		6	21

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the English Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	8				2								10			
Complete Jr.	1		3		2			1	10				13		3	1
Complete Soph.		1							1				1	1		
N	9	1	3		4			1	11				24	1	3	1
				13				5				11				29
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	16				14				1				31			
Complete Jr.	1		3		6	1	4		28				35	1	7	
Complete Soph.		2					1	1	3	1	2		3	3	3	1
N	17	2	3		20	1	5	1	32	1	2		69	4	10	1
				22				27				35				84
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	24				16				1				41			
Complete Jr.	2		6		8	1	4	1	38				48	1	10	1
Complete Soph.		3					1	1	4	1	2		4	4	3	1
N	26	3	6		24	1	5	2	43	1	2		93	5	13	2
				35				32				46				113

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Foreign Language Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	4				3								7			
Complete Jr.					2				6				8			
Complete Soph.			2						2				2		2	
N	4		2	6	5			5	8			8	17		2	19
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	12				8				1				21			
Complete Jr.		1			3		1		12				15	1	1	
Complete Soph.			1				1		1				1		2	
N	12	1	1	14	11		2	13	14			14	37	1	3	41
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	16				11				1				28			
Complete Jr.		1			5		1		18				23	1	1	
Complete Soph.			3				1		3				3		4	
N	16	1	3	20	16		2	18	22			22	54	1	5	60

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Language Arts Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate					1								1			
Complete Jr.									3				3			
Complete Soph.									1				1			
N					1				4				5			
				-				1				4				5
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	7				7								14			
Complete Jr.			2		3				9				12		2	
Complete Soph.			1						1				1		1	
N	7		3		10				10				27		3	
				10				10				10				30
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	7				8								15			
Complete Jr.			2		3				12				15		2	
Complete Soph.			1						2				2		1	
N	7		3		11				14				32		3	
				10				11				14				35

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Mathematics Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	11				14				1				26			
Complete Jr.	1		2	1	7		3		28				36		5	1
Complete Soph.		1	1				1		10			1	10	1	2	1
N	12	1	3	1	21		4		39			1	72	1	7	2
				17				25				40				82
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate					3								3			
Complete Jr.			2		1		1		8				9		3	
Complete Soph.			1				2			1	2			1	5	
N			3		4		3		8	1	2		12	1	8	
				3				7				11				21
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	11				17				1				29			
Complete Jr.	1		4	1	8		4		36				45		8	1
Complete Soph.		1	2				3		10	1	2	1	10	2	7	1
N	12	1	6	1	25		7		47	1	2	1	84	2	15	2
				20				32				51				103

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Natural Science Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	15				7								22			
Complete Jr.	1	1	1	1	4	1	1		24				29	2	2	1
Complete Soph.			1	1			2		1		1		1		4	1
N	16	1	2	2	11	1	3		25		1		52	2	6	2
				21				15				26				62
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	2				1								3			
Complete Jr.					4	1	1		6	1			10	2	1	
Complete Soph.											1				1	
N	2				5	1	1		6	1	1		13	2	2	
				2				7				8				17
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	17				8								25			
Complete Jr.	1	1	1	1	8	2	2		30	1			39	4	3	1
Complete Soph.			1	1			2		1		2		1		5	1
N	18	1	2	2	16	2	4		31	1	2		65	4	8	2
				23				22				34				79

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Physical Science Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate					2								2			
Complete Jr.									9		1		9		1	
Complete Soph.									2				2			
N				-	2			2	11		1	12	13		1	14
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate																
Complete Jr.																
Complete Soph.									1				1			
N				-				-	1			1	1			1
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate					2								2			
Complete Jr.									9		1		9		1	
Complete Soph.									3				3			
N				-	2			2	12		1	13	14		1	15

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Social Studies Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	24				15				1				40			
Complete Jr.	1	4	15		16	2	4	1	23	1		1	40	7	19	2
Complete Soph.		1	1			3			11		1		11	4	2	
N	25	5	16	46	31	5	4	1 41	35	1	1	1 38	91	11	21	2 125
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	4				5								9			
Complete Jr.	1				4				18			1	23			1
Complete Soph.		2		1				1			1			2	1	2
N	5	2		1 8	9			1 10	18		1	1 20	32	2	1	3 38
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	28				20				1				49			
Complete Jr.	2	4	15		20	2	4	1	41	1		2	63	7	19	3
Complete Soph.		3	1	1		3		1	11		2		11	6	3	2
N	30	7	16	1 54	40	5	4	2 51	53	1	2	2 55	123	13	22	5 63

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Speech Curriculums.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	2				3								5			
Complete Jr.		2		1	3		1		7				10	2	1	1
Complete Soph.			1	1					2	1			2	1	1	1
N	2	2	1	2 7	6		1	7	9	1		10	17	3	2	2 24
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	5				5								10			
Complete Jr.			3		1		1		5				6		4	
Complete Soph.			1		1				3				4		1	
N	5		4	9	7		1	8	8			8	20		5	25
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	7				8								15			
Complete Jr.		2	3	1	4		2		12				16	2	5	1
Complete Soph.			2	1	1				5	1			6	1	2	1
N	7	2	5	2 16	13		2	15	17	1		18	37	3	7	2 49

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Speech Pathology Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	3				1								4			
Complete Jr.	1				1						1		2		1	
Complete Soph.			1												1	
N	4		1	5	2			2			1	1	6		2	8
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	3				12								15			
Complete Jr.					1		1		5				6		1	
Complete Soph.									2				2			
N	3			3	13		1	14	7			7	23		1	24
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	6				13								19			
Complete Jr.	1				2		1		5		1		8		2	
Complete Soph.			1						2				2		1	
N	7		1	8	15		1	16	7		1	8	29		3	32

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Art Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	9				4								13			
Complete Jr.	1				2				6				9			
Complete Soph.								1	1				1			1
N	10				6			1	7				23			1
				10				7				7				24
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	13				12								25			
Complete Jr.	1	1	5		6		2		14			1	21	1	7	1
Complete Soph.		1	1				4		2	1	1		2	2	6	
N	14	2	6		18		6		16	1	1	1	48	3	13	1
				22				24				19				65
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	22				16								38			
Complete Jr.	2	1	5		8		2		20			1	30	1	7	1
Complete Soph.		1	1				4	1	3	1	1		3	2	6	1
N	24	2	6		24		6	1	23	1	1	1	71	3	13	2
				32				31				26				89

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Business Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Men	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	9				9				3				21			
Complete Jr.			3		3		1	1	5				8		4	1
Complete Soph.			1	1					2		1		2		2	1
N	9		4	1	12		1	1	10		1		31		6	2
				14				14				11				39
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	7				3				1				11			
Complete Jr.					2		2		8				10		2	
Complete Soph.			1				1		3				3		2	
N	7		1		5		3		12				24		4	
				8				8				12				28
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	16				12				4				32			
Complete Jr.			3		5		3	1	13				18		6	1
Complete Soph.			2	1			1		5		1		5		4	1
N	16		5	1	17		4	1	22		1		55		10	2
				22				22				23				67

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men in the Industrial Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	29				24				2				55			
Complete Jr.			1		5		2		28				33		3	
Complete Soph.							2	1	8		2	1	8		4	2
N	29		1		29		4	1	38		2	1	96		7	2
				30				34				41				105
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate																
Complete Jr.																
Complete Soph.																
N				-				-				-				-
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	29				24				2				55			
Complete Jr.			1		5		2		28				33		3	
Complete Soph.							2	1	8		2	1	8		4	2
N	29		1		29		4	1	38		2	1	96		7	2
				30				34				41				105

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Music Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	6				7								13			
Complete Jr.	2				3	1	1		9				14	1	1	
Complete Soph.			1			1									3	
N	8		1		10	1	3		9				27	1	4	
				9				14				9				32
Female	Per	Tran	W/d	Drpp	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	8				7								15			
Complete Jr.			1	1	5				10				15		1	1
Complete Soph.			1	1			3	1	2				2		4	2
N	8		2	2	12		3	1	12				32		5	3
				12				16				12				40
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	14				14								28			
Complete Jr.	2		1	1	8	1	1		19				29	1	2	1
Complete Soph.			2	1			5	1	2				2		7	2
N	16		3	2	22	1	6	1	21				59	1	9	3
				21				30				21				72

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men in the Physical Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	23				6								29			
Complete Jr.	2		3		18		1	4	20				40		4	4
Complete Soph.			2				2	1	9		2	2	9		6	3
N	25		5		24		3	5	29		2	2	78		10	7
				30				32				33				95
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate																
Complete Jr.																
Complete Soph.																
N																
				--				-				-				-
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	23				6								29			
Complete Jr.	2		3		18		1	4	20				40		4	4
Complete Soph.			2				2	1	9		2	2	9		6	3
N	25		5		24		3	5	29		2	2	78		10	7
				30				32				33				95

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Women in the Physical Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate																
Complete Jr.																
Complete Soph.																
N								-				-				-
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	10				15								25			
Complete Jr.	1			1	9		1	2	23		1		33		2	3
Complete Soph.							2	2	2		2	2	2		4	4
N	11			1 12	24		3	4 31	25		3	2 30	60		6	7 73
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	10				15								25			
Complete Jr.	1			1	9		1	2	23		1		33		2	3
Complete Soph.							2	2	2		2	2	2		4	4
N	11			1 12	24		3	4 31	25		3	2 30	60		6	7 73

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Recreation Leadership I Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	3				6								9			
Complete Jr.					1		1						1		1	
Complete Soph.									1				1			
N	3				7		1		1				11		1	
				3				8				1				12
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	6				5								11			
Complete Jr.				1			1		3				3		1	1
Complete Soph.									2				2			
N	6			1	5		1		5				16		1	1
				7				6				5				18
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	9				11								20			
Complete Jr.				1	1		2		3				4		2	1
Complete Soph.									3				3			
N	9			1	12		2		6				27		2	1
				10				14				6				30

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Recreation Leadership II Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**
Graduate	7				3								10			
Complete Jr.			3		7		1		3				10		4	
Complete Soph.			1	1		1	3		2		1		2	1	5	1
N	7		4	1	10	1	4		5		1		22	1	9	1
				12				15				6				33
Female	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**
Graduate	6												6			
Complete Jr.	2		2		2				4		1		8		3	
Complete Soph.									2				2			
N	8		2		2				6		1		16		3	
				10				2				7				19
Male & Female	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**	**Per**	**Tran**	**W/d**	**Drop**
Graduate	13				3								16			
Complete Jr.	2		5		9		1		7		1		18		7	
Complete Soph.			1	1		1	3		4		1		4	1	5	1
N	15		6	1	12	1	4		11		2		38	1	12	1
				22				17				13				52

The Status and Level Completed at the Close of Spring Quarter, 1959 of Three Entering Junior Classes of Men and Women in the Nursing Education Curriculum.

	1956-57				1957-58				1958-59				Total Over Years			
Male	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	1												1			
Complete Jr.																
Complete Soph.																
N	1			1				-				-	1			1
Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	15				31				6				52			
Complete Jr.			2		4		3		21		3		25		8	
Complete Soph.																
N	15		2	17	35		3	38	27		3	30	77		8	85
Male & Female	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop	Per	Tran	W/d	Drop
Graduate	16				31				6				53			
Complete Jr.			2		4		3		21		3		25		8	
Complete Soph.																
N	16		2	18	35		3	38	27		3	30	78		8	86